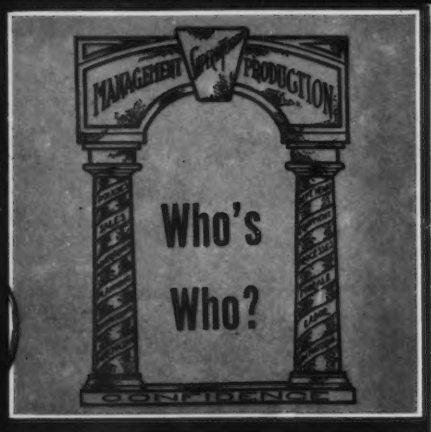
Paper
TRADE JOURNAL
JUNE 22, 1932



LIBRARY
SCHOOL OF AGRICULTURE
A. P. I.

WOOD
PULP
G

Established 1886

"Hail! Independence, hail!
Heaven's next best gift
To that of life itself."
JAMES THOMSON

As the Nation again prepares to celebrate the anniversary of our Independence, let us be ever mindful of the priceless value of Liberty . . . particularly with unfortunate millions elsewhere still fettered physically or shackled mentally.

Be mindful, too, of the inestimable role Pulp and Paper has played in bringing the peoples everywhere the inspiration to fight eternally for Freedom.

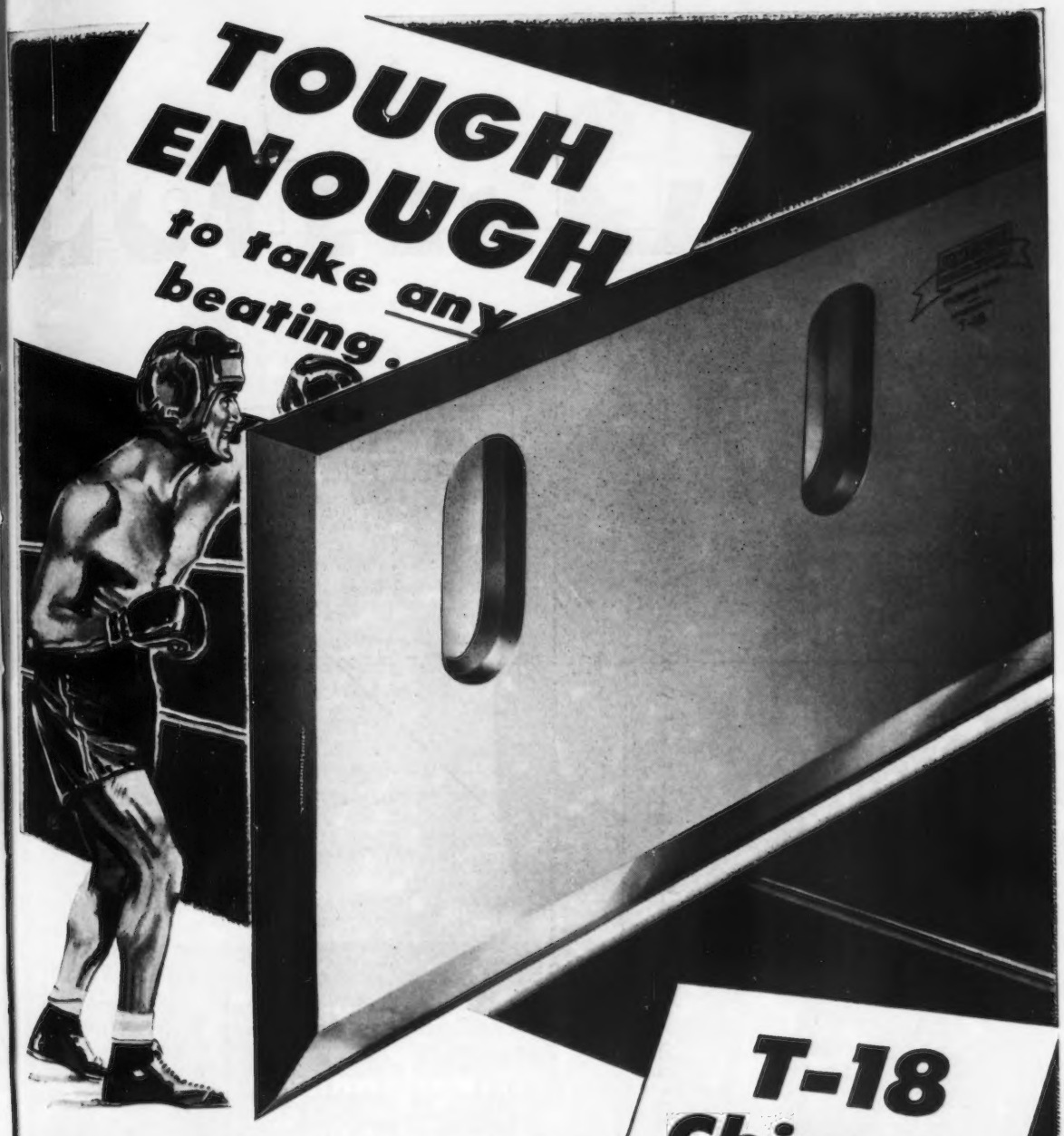
GOTTESMAN & COMPANY
— INCORPORATED —
100 PARK AVENUE • NEW YORK 17, N. Y.
EUROPEAN OFFICES: Birger Jarlsgatan 8, Stockholm, Sweden

PARTICIPANTS IN THE PROGRESS OF PAPER-MAKING

Forest Products... pulp wood, primary source of the cellulose fiber essential to paper-making, is now grown as a crop . . . a new concept which insures the continuing stability of one of America's greatest industries.

Fourdrinier Wires... also essential to paper-making, benefit from 56 years of fabrication experience at Appleton Wire Works, Inc., where continuous research — directed toward making a better product — has *earned* the acknowledgment that *"Appleton Wires are Good Wires!"*

APPLETON WIRE WORKS, INCORPORATED • APPLETON, WISCONSIN



SIMONDS

T-18 Chipper Knives

Chips aren't bruised and "beat-up" . . . they're not mashed and of uneven length . . . when they come out from under a Simonds T-18 Knife. But they *are* uniform in size, and that means they "cook" more quickly and evenly . . . make better-grade pulp.

Make sure you aren't losing money in your wood room. Equip all your chippers with these extra-tough knives of special Simonds T-18 Steel. They hold their cutting edge . . . hold your chip-output up and your sawdust-loss down.

Check your dealer today.

SIMONDS
SAW AND STEEL CO.
FITCHBURG, MASS.

Factory Branches in Boston, Chicago, San Francisco and Portland, Ore.
Canadian Factory in Montreal, Que.

APPLETON FELTS*

*for...

...service
...uniformity
...dependability
...design and finish

APPLETON WOOLEN MILLS • APPLETON WIS.

Paper TRADE JOURNAL

VOL. 134 JUNE 27, 1952 No. 26

FEATURES

	Page
Calling All Publishers and Mr. Cellar	35
33rd Annual Superintendent's Meeting Features Employee and Management Cooperation	36
Government Bids and Awards	49
Who's Who Among the Superintendents	Between 52 and 53
The Third Generation	53
The Key to the Safety Program—The Foreman	55
Inlets and Slices	56
Financial Aspects of Paper Mill Operation	59
What Labor Unions Have Meant to the Paper Industry	62
Tramp Iron Problem in Paper Industry	64
The American Paper Industry Needs Straw and Bagasse	68
Impregnating and Coating of Specialty Papers	83
Increased Production from Existing Machines	87
What Is Wrong with Paperboard?	96
Polyphosphates in the Paper Industry	98
Management Problems in Paper Industry Today	103
Importance of Liquid Volume and Liquor Concentration on Kraft Pulping	107

DEPARTMENTS

Our Business	31	Prices	47
Trends	33	Material Prices	48
News of the Week	35	Technical Publications	48
People	43	Industrial Section	53
Suppliers	43	Production Ratio	110
Financial	43	Obituaries	112
What's New in Equipment	45	ADVERTISERS INDEX	128
CLASSIFIED ADVERTISING	116		

PUBLISHED EVERY FRIDAY

LOCKWOOD TRADE JOURNAL CO., INC., 15 West Forty-Seventh Street, New York 36

Phone: PLaza 7-2370

GEORGE E. LOCKWOOD, President and Treasurer
ARTHUR E. GORDON, Vice-President
FREDERICK E. WINKLER, Secretary

HENRY J. PERRY, Editor
R. E. THUEMMES, Managing Editor
E. P. McGINN, Industrial Editor
E. P. NUTTALL, Associate Editor

Entered as Second Class Matter at the post office at East Stroudsburg, Pa., under Act of Congress of March 3, 1879. Publication Office at Lockwood Trade Journal Co., Inc., 34 North Crystal St., East Stroudsburg, Pa. Printed in U.S.A. Copyright 1952 by Lockwood Trade Journal Co., Inc. PAPER established Feb. 17, 1899, combined with PAPER TRADE JOURNAL Nov. 16, 1899. PAPER established Sept. 21, 1910, combined with PAPER TRADE JOURNAL February 19, 1926. All rights to the above titles reserved. Contents of PAPER TRADE JOURNAL, including all articles, illustrations, etc., are copyrighted and may not be reprinted except by permission. PAPER TRADE JOURNAL is indexed in Industrial Arts Index and Engineering Index. Also publisher of LOCKWOOD'S Annual DIRECTORY OF THE PAPER AND ALLIED TRADES.

NEXT WEEK

Pulpwood is the life blood of the paper industry. How are its ceiling prices developed? Read Henry C. Waldo of OPS.

While we are the world's largest producer of sulphur, we all know that we also are required to supply the free world. Gone are the days of lavish use. Conservation is the watchword. Trobeck of Sweden presents some data on how to save sulphur in kraft mills.

REMEMBER THESE DATES

SEPT. 9-13: Seventh National Chemical Exposition, Chicago, Ill.

SEPT. 18-21: Northeastern Div., of the American Pulp and Paper Mill Superintendents Assn., Poland Spring House, Poland Spring, Maine.

SEPT. 26-27: Pennsylvania-New Jersey-Delaware Div. of American Pulp and Paper Mill Superintendents Assn., Fall Meeting, Galen Hall Hotel, Wernersville, Berks County, Pa.

OCT. 8-10: The Southern and Southeastern Divisions of the American Pulp and Paper Mill Superintendents Assn., Joint Meeting, Hotel Roanoke, Roanoke, Va.

OCT. 11: Connecticut Valley Div. of American Pulp and Paper Mill Superintendents Assn., Fall Meeting, Berkshire Inn, Great Barrington, Mass.

OCT. 13-16: Printing Industry of America, Chase Hotel, St. Louis, Mo.

NOV. 14-16: Alkaline Pulping Conference, Technical Assn. of the Pulp and Paper Industry, Battle House, Mobile, Ala.

NOV. 20-21: Corrugated Containers Committee of Technical Assn. of Pulp and Paper Industry, Conference, Hotel Schroeder, Milwaukee, Wis.

DEC. 1-6: Twentieth National Exposition of Power and Mechanical Engineering, Grand Central Palace, New York, N. Y.

DEC. 7-10: The American Institute of Chemical Engineers, Annual Meeting, Cleveland Hotel, Cleveland, Ohio.

SUBSCRIPTIONS

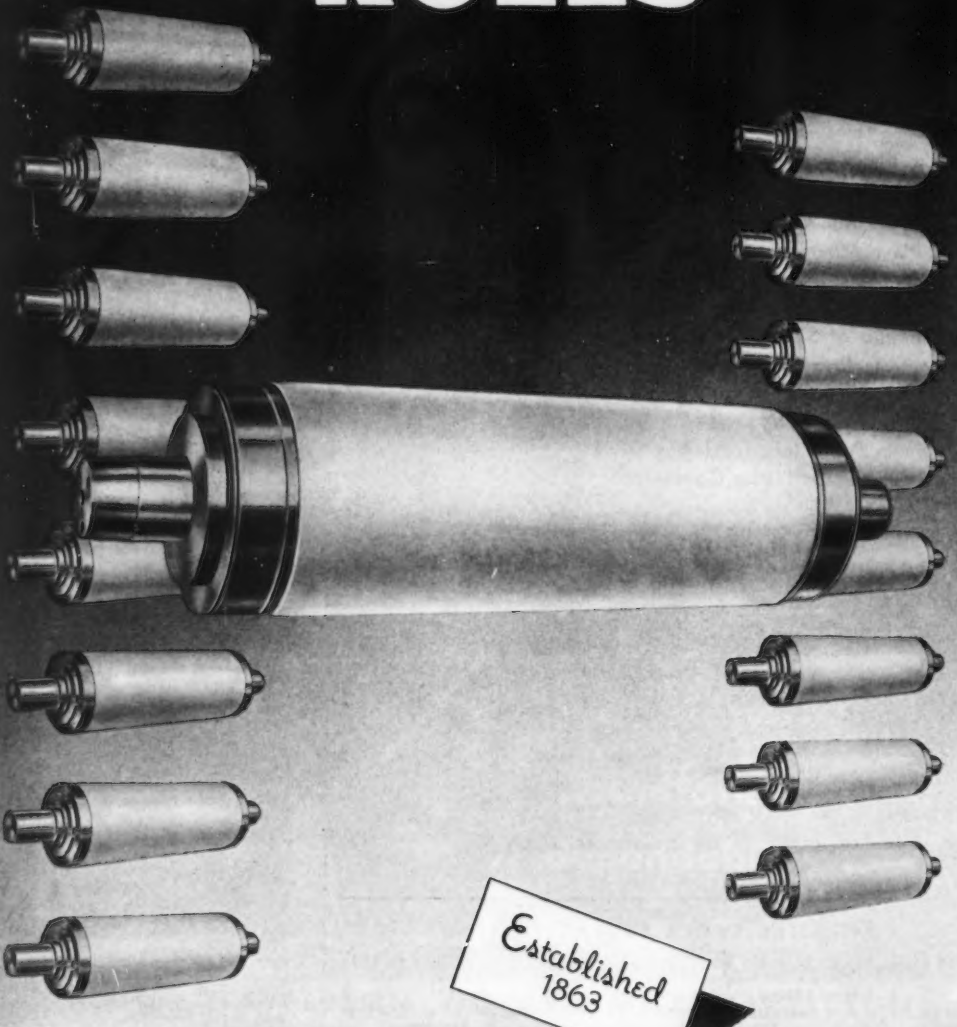
Payable in advance—This Copy $1.50—U. S. $5.00 per year—U. S. Possessions $7.00 per year.

Canada $7.00 per year—Canadian Funds acceptable.

Latin American Countries $15.00 per year.

All Other Countries $20.00 per year.

"HOLYOKE"
CALENDER ROLLS

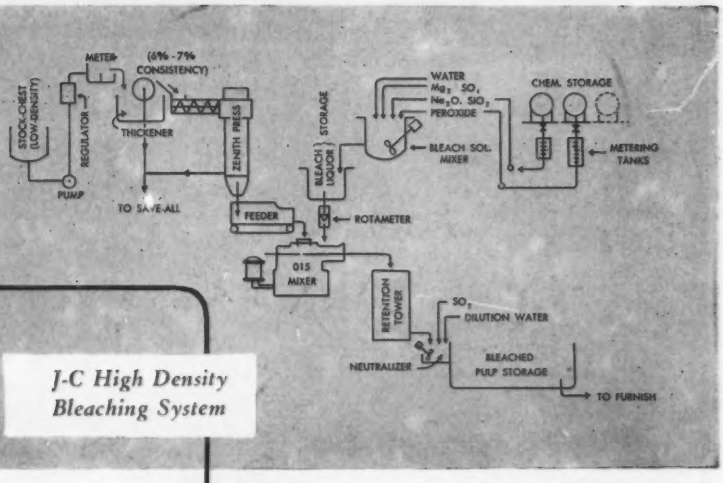


Established 1863

HOLYOKE MACHINE COMPANY

CALENDER ROLLS for the PAPER and TEXTILE INDUSTRIES
WATER FILTRATION EQUIPMENT
HOLYOKE, MASSACHUSETTS

Jackson and Church — HIGH DENSITY SYSTEM

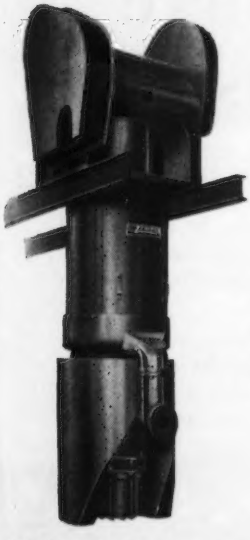


J-C High Density Bleaching System

saves up to 30% in bleach consumption

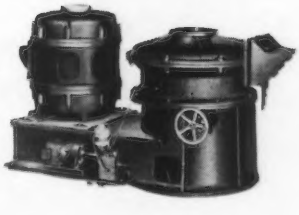
- High density—35 to 40% or higher
- Continuous operation
- Fully automatic operation
- Selective pressure control
- Product of uniform consistency
- Moderate first cost
- Extremely rugged construction
- Available in corrosion resistant alloys
- Low power requirement
- Minimum floor space
- Aids in good housekeeping

DESIGNED FOR USE IN J-C HIGH DENSITY SYSTEM



J-C ZENITH PRESS*

100% automatic operation for undiluted black liquor recovery, de-inking or de-watering pulp for storage at high density.



J-C SHREDDER-MIXER*

Used for introducing bleach solution uniformly in high density peroxide bleaching.

For further information or engineering assistance write Dept. PTJ

PRODUCTS OF

*Pat. appl'd. for

JACKSON & CHURCH COMPANY · SAGINAW, MICHIGAN

Typical wool showroom, where buyers make their selection.

Photographs courtesy of Wool Bureau, Inc.

Out Where Huyck Felts Begin

First, the fleece. From 1,500 classified types, buyers choose only those special wools that meet the exacting requirements of Huyck Felts. In the principal wool-growing countries of the world this discriminating selection goes on. For these must be just certain wools, rare and costly.

In they come, to the great wool warehouses at Rensselaer, New York. From this vast supply, skilled sorters select the grades specified for each type of felt, then blend them for the precise task the felt is to perform on the paper machine.

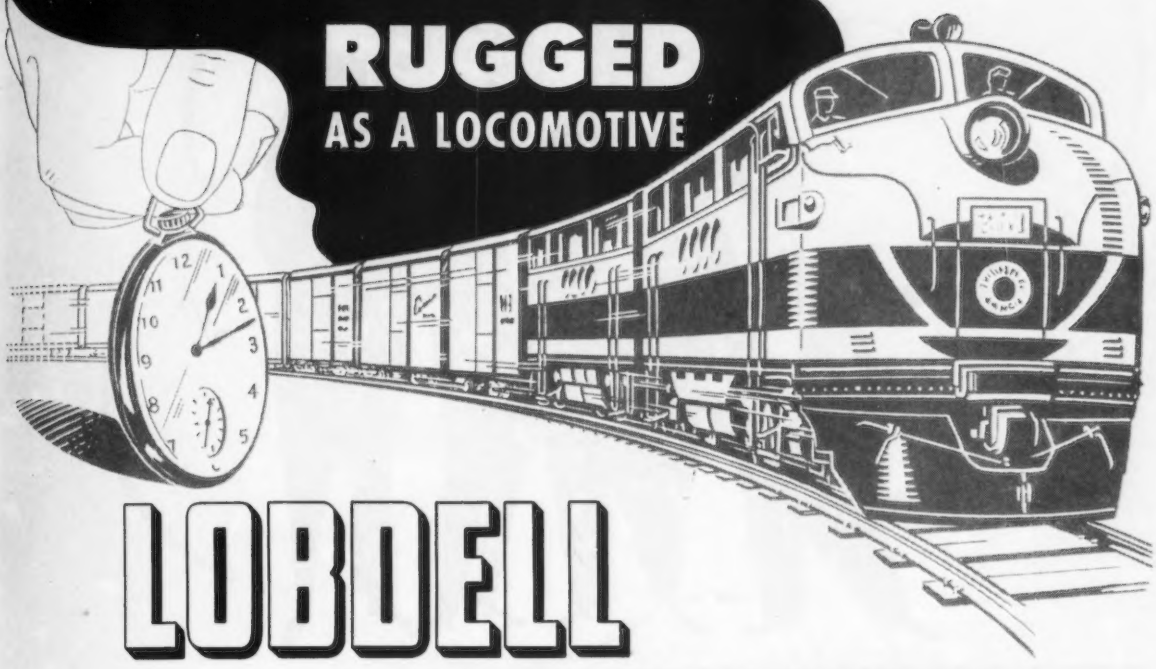
This is the first, and only the first step in making the famous Huyck felts which for 82 years have rendered such essential service to the pulp and paper industry.

KENWOOD TEXTILE PRODUCTS

HUYCK *Felts*

F. C. Huyck & Sons — Kenwood Mills — Rensselaer, N. Y.

ACCURATE AS A FINE WATCH... RUGGED AS A LOCOMOTIVE



LOBDELL

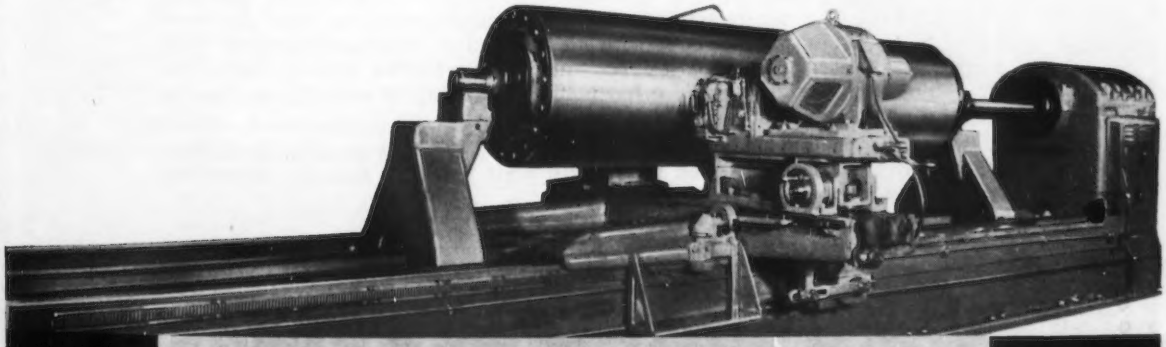
TYPE CW ROLL GRINDER

Rugged, extremely accurate, with ease and flexibility of operation . . . the huge LOBDELL Type CW Roll Grinder is a proper supplement to the giant paper machines of today. Designed for Direct Current operation, but for connection to an A.C. power supply, the LOBDELL Type CW has a heavier, more massive wheel carriage and grinding wheel head construction . . . and the rigidity and capacity necessary to handle rolls of 48″ and 60″ diameter, with bed length to suit the length of roll face.

Accuracies of .0005″ on the diameter of a press roll with rubber cover hard enough to measure accurately *are usual* . . . accuracies of .00025″ and closer are obtained on straight or crowned rolls of chilled iron.

Other LOBDELL Grinders, Type GHV for A.C. operation are made in three smaller sizes to suit the requirements of any mill.

FREE — ask for your copy of our useful Paper Mill Roll Grinder Catalog, today!

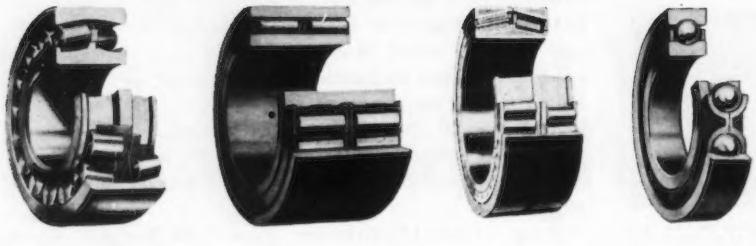


1836

LOBDELL UNITED COMPANY
WILMINGTON 99, DELAWARE
A SUBSIDIARY OF UNITED ENGINEERING AND FOUNDRY COMPANY

1952

designed for harmony...



Torrington engineers have a thorough knowledge of the friction problems encountered in virtually every type of mechanical equipment. And they have had many years of experience with *all* types of anti-friction bearings. They are able to give sound, unbiased recommendations for the bearings best suited for the job at hand. Result: a harmonious blending of anti-friction bearing types with the products in which they are used.

Torrington engineers will be glad to help you—as they have many others—to select the bearings which will assure your products smooth, dependable operation.

THE TORRINGTON COMPANY
South Bend 21, Ind. Torrington, Conn.
District Offices and Distributors in Principal Cities of United States and Canada

TORRINGTON BEARINGS

Spherical Roller • Tapered Roller • Straight Roller • Needle • Ball • Needle Rollers

where there's smoke there's bound to be fire

Here's a quality builder, tonnage booster, steam saver and all-round money maker that has long since become standard equipment on all new paper machines and on many of the older ones—Fulton Dryer Drainage on the Dryer Section.

Already close to 1000 such systems are in service—unshakable and absolute proof that Fulton Dryer Drainage is an indispensable drying aid. Surely where there's so much smoke there must be fire.

The foregoing is not addressed to Superintendents with the more modern machines under their command for they have Fulton Systems. Rather, it is aimed at the top executives and Superintendents operating older machines—pitched to reach mills with smaller machines. It is there that the hesitation is greatest, the need of better drying conditions most pressing.

If we of Midwest-Fulton can prompt you of the older mills, and you of the smaller mills, to investigate Fulton Dryer Drainage, you'll want Fulton Dryer Drainage. If you'll study it on some of the 1000 machines that have it, you'll go still further and demand it.

- Applicable to older and smaller machines? Absolutely yes.
- Too costly? No. The cost (in the form of loss) is incurred by being without it.

Get Technical Bulletin—Now

A typical Fulton Sectional Drainage Unit for small machines.

10% to 30% production increase guaranteed.

Positive reduction in steam costs--even with tonnage gains.

Improved quality. Uniform drying. Less cockle or curl.

Moisture content control. No over-drying.

Engineering survey-machine study. No obligation.

THE MIDWEST • FULTON MACHINE CO.
DAYTON 3, OHIO

You can't think of felts without thinking of

HAMILTON FELTS

As a mill man, you are a practical man, not given to abstract thinking. Even such a common word as *paper* suggests to your mind the particular product you are manufacturing—book, bond, writing, tissue, kraft or board.

You think of what furnish goes into it; how it is reduced to proper consistency by the jordans and beaters; how it travels from the fourdrinier or the cylinders on the felt that carries it through the press and to the driers.

And you can't possibly think of felts without thinking of Hamilton Felts. You know that all felts look much alike and that they are the most perishable items of machine equipment.

Yet you somehow know that Hamilton Felts remove water faster; last longer; give finer finish to your sheets. And that is why you can't think of felts without thinking of Hamilton Felts.

MIAMI WOOLEN MILLS

Established 1858

Hamilton Felts

- From the thinnest tissue to the heaviest board there is a Hamilton Felt that will do your work better, faster and at lower cost.

SHULER & BENNINGHOFEN, HAMILTON, OHIO

Modernization Pays

Profits from stepped-up production, better sheet quality and a wider range of paper products have paid for machine modernization programs in some of America's greatest mills.

Modernization may mean the replacement of an obsolete drive, the addition of a new Wet End, a new Press Part, a new Size Press. It may call for the replacement of inefficient dryers. It might be the complete rebuilding of the machine itself.

As a typical example, Union Bag and Paper Corporation, Savannah, Ga., recently replaced all the low pressure 65 pound dryers (71 paper and 18 felt) in their No. 4 machine with new high-pressure 125 pound dryers. In a unique operation, their engineers, maintenance and operating crews made the change while the machine continued to turn out paper, by isolating each of the four dryer sections in turn, then by-passing that section in which the new dryers were being installed. The machine was stopped only long enough to disconnect the dryer section to be changed. About a week prior to each shut-down the bottom dryer felt on the particular section was removed and necessary work begun to permit by-passing the sheet.

If you are faced with high maintenance costs, if you require a greater range of high grade paper products – whatever your modernization problems may involve – get the benefits of Puseyjones experience. Call or write us today.

THE PUSEY AND JONES CORPORATION
Established 1848. Builders of Paper-Making Machinery
Fabricators and Welders of all classes of Steel and Alloy Products
Wilmington 99, Delaware, U.S.A.

THE SIGN OF TRADE MARK SUPERIOR QUALITY

High-pressure dryers in place ready for installation of felts.

Basement run of paper when by-passing the isolated section and while new dryers being installed.

CHAMPION PAPERS
CHAMPION PAPERS
No one grade of coated paper can satisfactorily meet the demands of every printing job. That is why Champion
grades of coated paper to meet your specific requirements.
HINGEFOLD • SATIN PROOF • REFOLD
WEDGWOOD COATED OFFSET • HAMILTON
FALCON • FORMAT
Whatever Your Paper Problem ... It's a Challenge to Champion!
THE CHAMPION PAPER AND FIBRE COMPANY
HAMILTON, OHIO

You saw this advertisement in Fortune

Huber's Quality Clays meet Champion's paper-coating requirements

"No one grade of coated paper can satisfactorily meet the demands of every printing job," says The Champion Paper and Fibre Company.

And no one coating clay can meet the demands of modern paper-coating requirements! Huber produces five grades of coating clays—each designed to give smoothness, brightness and high-fidelity reproduction.

That's why Champion turns to Huber as a source of coating clays for its various grades of coated papers. Huber's rigid quality controls—13 vital laboratory tests* from crude clay to finished product—assure grade uniformity from one clay carload to the next.

If you want maximum performance from your papers, try Huber Clays. Write today for your free working sample.

HUBER

ONE OF THE WORLD'S LARGEST CLAY PRODUCERS

MINES & PLANTS: LANGLEY, S. C., GRANITEVILLE, S. C., AND HUBER, GA.

J. M. HUBER CORPORATION, 100 PARK AVENUE, NEW YORK 17, N.Y.

Quality Clays for the Paper Industry

HI-WHITE—low cost airfloated filler clay, mined in Georgia, of high brightness, fine particle size, minimum abrasion. Tested regularly each half-hour during production.

PARAGON—produced in South Carolina, this low cost airfloated filler has a slightly larger particle size than Hi-White, its Georgia counterpart. Refined to the same close specifications with respect to abrasion and uniformity.

WWF—a Georgia water-washed filler of high, dependable brightness. Available in lump form for use where this type is preferred over the fluffier airfloated fillers. Also available pulverized.

HYDRATEX—a Georgia coating grade of medium particle size distribution and priced accordingly. Quality controlled throughout. Lump or pulverized.

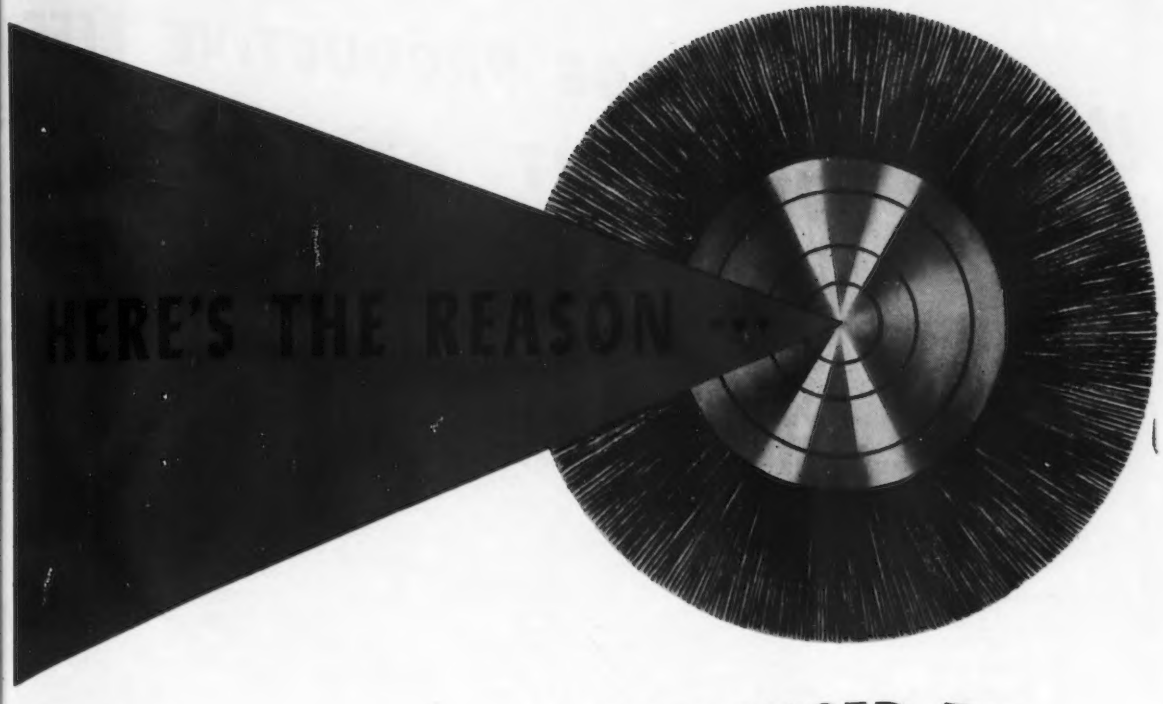
SPECIAL HYDRATEX—a Georgia coating grade of fine particle size, with excellent covering power and flow characteristics ideally suited to certain coating methods. Lump or pulverized.

X-43—a fine particle Georgia coating clay of low viscosity and high brightness particularly well adapted to high solids coating. Lump or pulverized.

X-44—a low viscosity Georgia coating grade containing a minimum of soluble salts; excellent for color pigmentation. Lump or pulverized.

HYDRASPERSE—a drum-dried low viscosity, high brightness, fine particle, Georgia coating grade, in flake form, with the dispersant already added. Saves "make down" time and assures thorough dispersion in practically any equipment.

*1. Brightness 2. Viscosity 3. Particle Size 4. pH 5. Screen Residue 6. Adhesive Demand 7. Gloss 8. Opacity 9. Dispersion 10. Soluble Salts 11. Abrasion 12. Moisture 13. Suspension



WHY PAPER MILLS CHANGED TO... METLKOR®

Paper manufacturers are cutting costs by turning to patented Jenkins' METLKOR – the cylinder brush that lasts *3 to 12 times longer and can be rebristled.*

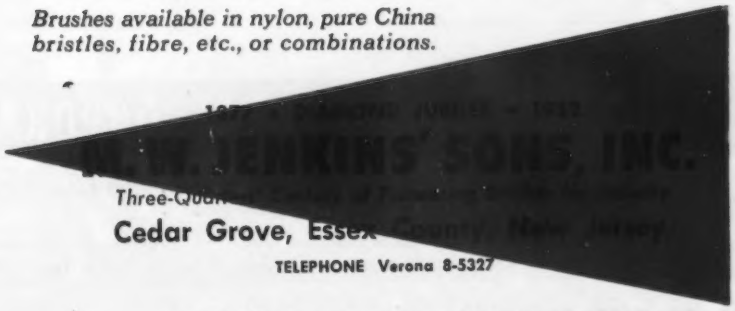
METLKOR bristle is *tuft-set* in notched flat corrosion-resistant wire, wound on metal cores and sealed in with solvent-water-proof baked plastic cement. Tough aluminum or cold drawn steel cores won't sag, split or get out of alignment. This unique construction makes METLKOR brushes easy to keep clean.

For coating, dusting, and other paper processes, replace your old type brushes with METLKOR. If you have a special brush problem, call on us, or write: M. W. Jenkins' Sons, Inc., Cedar Grove, Essex County, New Jersey.

Brushes available in nylon, pure China bristles, fibre, etc., or combinations.

FLAT FINISHERS FOR PAPER COATING

Jenkins' scrubbers, black China and Badger finishers are tuft-set with special cement in the new **LIFEWOOD** treated wood block. This exclusive Jenkins' development protects the wood against checking, cracks, decay, pest, stains, mildew and fungi.



INCREASE AVERAGE PRODUCTIVE LIFE OF THIS EQUIPMENT 331%

- Calender rolls
- Press rolls
- Printing rolls
- Embossing rolls
- Tube rolls
- Wallpaper rolls
- Sizing rolls
- Pasting rolls
- Breaker rolls
- Sweat rolls
- Creping rolls
- Table rolls
- Carrying rolls
- Idler rolls
- Drying rolls
- Couch rolls
- Screen plates
- Slice lips
- Guide bars
- Suction box covers
- Evaporator tubes
- Pump parts
- Drying drums
- Fourdrinier wires
- Shake rails
- Tanks
- Mixing kettles
- Knives

WITH CRODON PLATING

Here's how CRODON (industrial chromium plating) prolongs the life of your paper mill equipment. Application of chromium plate produces an intensely hard, smooth, protective coat on practically all base metals. It resists wear and abrasion. It retards corrosion. It insures more efficient machine performance. Replacement costs are saved. Operating delays are prevented. Improved paper quality is assured.

CRODON plating of your paper mill equipment will be done in the quickest, most efficient, and economical manner possible. When you operate with CRODON-plated machinery, you produce better paper at less cost.

Detailed information will be sent on request, or we shall be glad to discuss CRODON plating with you personally. Call or write the nearest plant.

CRODON
The Chrome Plate

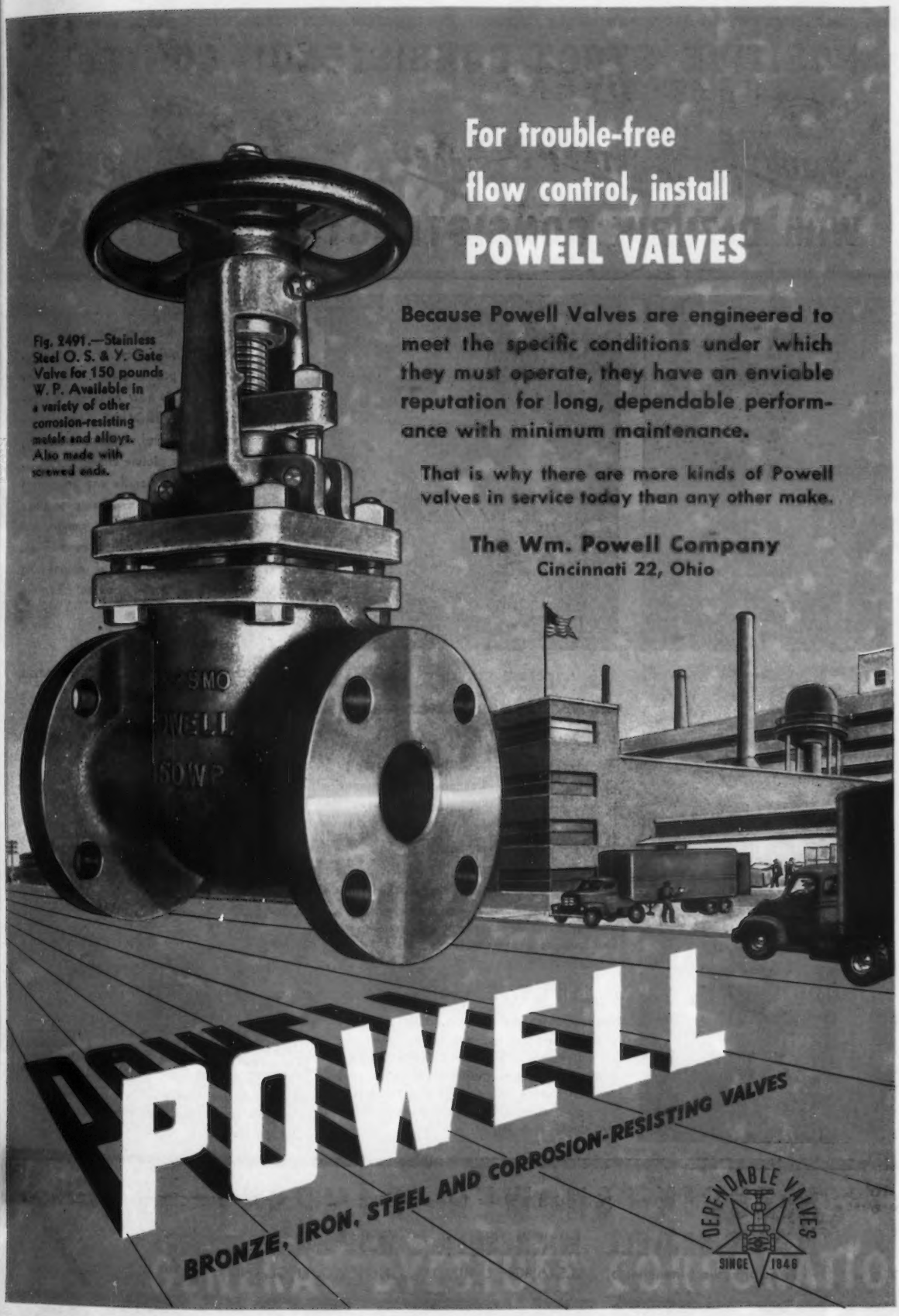
CHROMIUM CORPORATION OF AMERICA

Executive Offices: 100 East 42nd Street, New York 17, N. Y.

346 Huntingdon Ave.
Waterbury 90, Conn.

1760 Lakeview Road
Cleveland 12, Ohio

4645 West Chicago Ave.
Chicago 51, Ill.


For trouble-free
flow control, install
POWELL VALVES
Because Powell Valves are engineered to meet the specific conditions under which they must operate, they have an enviable reputation for long, dependable performance with minimum maintenance.
That is why there are more kinds of Powell valves in service today than any other make.
The Wm. Powell Company
Cincinnati 22, Ohio
Fig. 2491.—Stainless Steel O. S. & Y. Gate Valve for 150 pounds W. P. Available in a variety of other corrosion-resisting metals and alloys. Also made with screwed ends.
POWELL
BRONZE, IRON, STEEL AND CORROSION-RESISTING VALVES
DEPENDABLE VALVES
SINCE 1846

POSITIVE STOCK-CONSISTENCY CONTROL

With DeZURIK CONSISTENCY REGULATORS

In more than 1000 installations, DeZURIK REGULATORS keep piling up proof of their complete efficiency in consistency-control at many process-stages. Their traditional superiority is now enhanced by 24-hour FULL-RECORDING function with Instrumentation Control, delivering a precise, lucid stock-system picture around the clock. DeZurik Regulators handle any assignment with ease. They are remarkably sensitive and accurate, yet extremely simple, and demand an absolute minimum of attention. They reflect long years of engineering experience ... and they reflect them in added mill profits!

3 VERSATILE TYPES

STUFF-BOX TYPE (Above)

The ideal regulator for basis weight control. Sets new standards of accuracy. Wide range of box designs to fit every requirement.

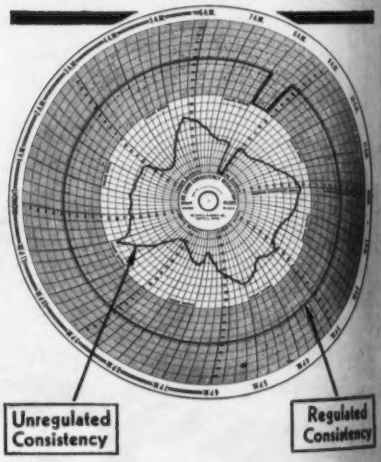
PAN TYPE (Above left)

Installed directly after washers, deckers, save-alls, etc., to make their operation fully-automatic. Regulates gravity-flow to chest without pumping. Saves cost of extra chests and pumps. Shower water is controlled by regulator.

PIPE-LINE TYPE (Left)

The one successful solution to the problem of producing uniform consistency in an enclosed system. Handles full volume being pumped without return overflow. No chest dilution; piping is simple and direct. Widely used on pressure refining, stock transmission and similar systems.

A GRAPHIC RECORD FOR EVERY 24-HOUR PERIOD



Let the largest builder of whole-volume regulators solve your consistency and basis-weight-control problems.

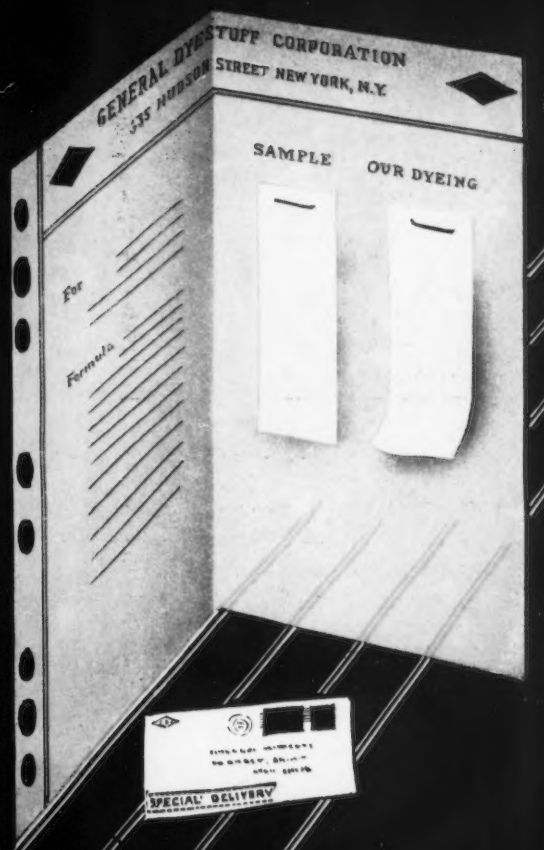
DeZURIK SHOWER COMPANY

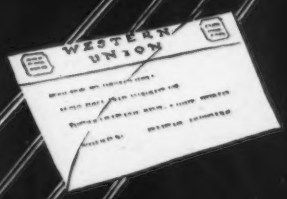
SARTELL, MINNESOTA .. U.S.A.

In Europe direct inquiries to MILLSPAUGH, LIMITED .. SHEFFIELD, ENGLAND

Write for New Regulator Bulletin

Color Matching Service

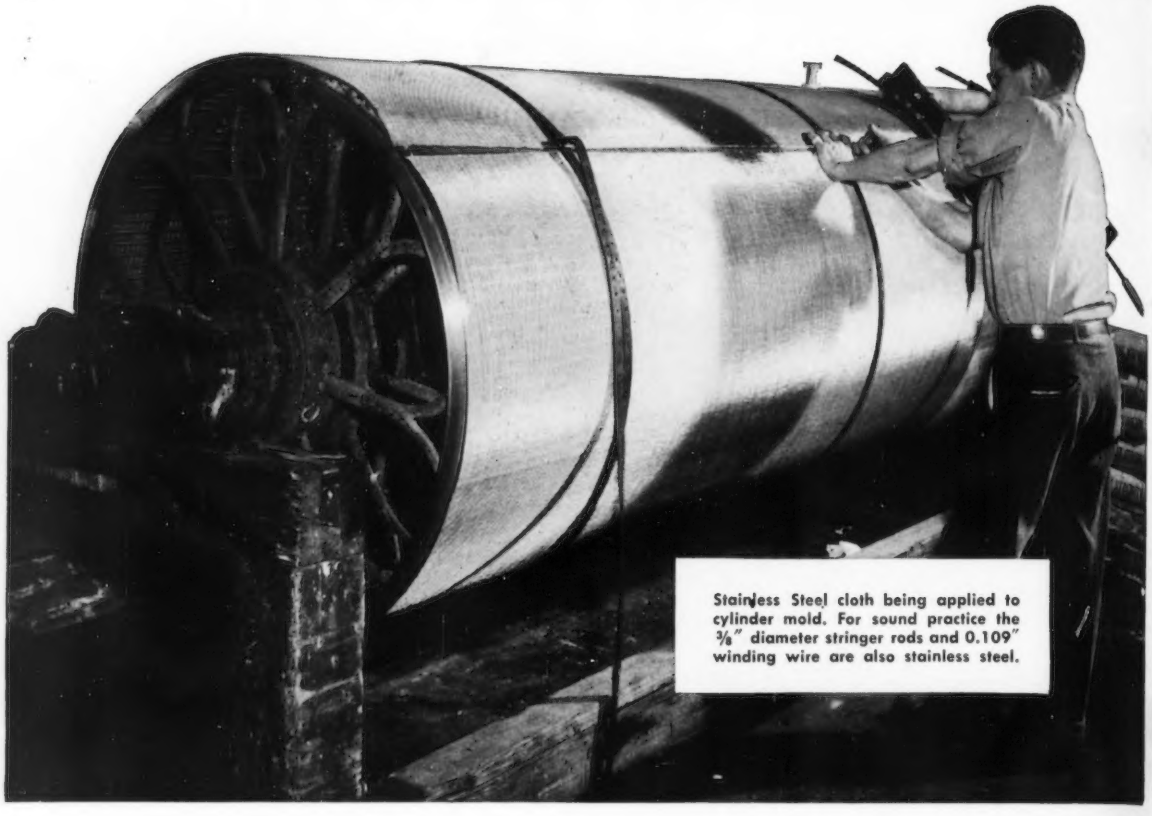




The General Dyestuff Corporation's Quick Color Matching Service is tuned to meet today's needs. Color matches are mailed to you the same day your request is received . . . formulas sent by wire or telephone at your request. We invite you to take advantage of our Quick Color Matching Service.

GENERAL DYESTUFF CORPORATION

435 HUDSON STREET · NEW YORK 14, N. Y.



Stainless Steel cloth being applied to cylinder mold. For sound practice the 3/8" diameter stringer rods and 0.109" winding wire are also stainless steel.

5 TIMES THE LIFE with stainless steel

That is the experience reported by a Midwestern board mill superintendent. By changing over from a non-ferrous metal to Type 302 stainless steel, his cylinder mold cloth-life went up from 9 weeks to 11 months. There's a good chance *your* operating conditions will permit you to do as well with all-stainless steel cylinder mold surfacing.

Armco supplies manufacturers stainless steel wire for cylinder mold stringer rods and windings; Armco Stainless Steel backing and facing cloth can be obtained from wire cloth makers.

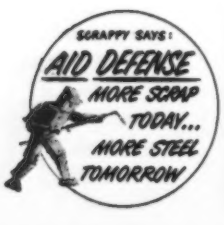
OTHER ARMCO STAINLESS STEELS

Your equipment manufacturer will be glad to help you select the right type of Armco Stainless Steel for your equipment. Among the many grades, there are the new "ELC" (extra-low-carbon) Types 304L and 316L for welded equipment subject to severely corrosive conditions. In service below 800 F, these grades are an effective and economical alternate for the stabilized Types 321 and 347.

Where severe corrosion is not a problem, consider the chromium Types 410 and 430. They are not restricted by NPA Order M-80 and are usually available for quick delivery.

WRITE FOR THE STORY

Write us for a copy of the booklet, "A Stainless Profit Story for the Paper Industry." It shows many of the applications in which Armco Stainless Steels may be used to advantage in protecting paper quality and reducing costs.



ARMCO STEEL CORPORATION

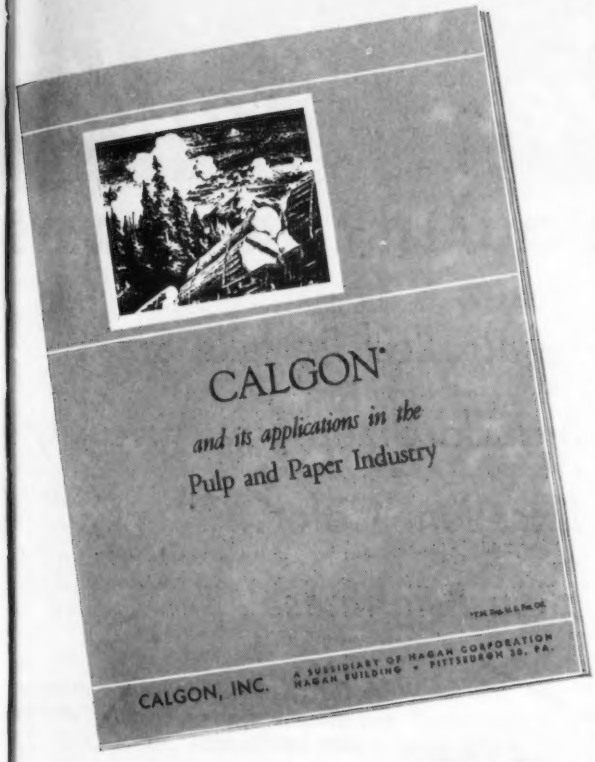
3632 CURTIS STREET, MIDDLETOWN, OHIO • PLANTS AND SALES OFFICES FROM COAST TO COAST • EXPORT: THE ARMCO INTERNATIONAL CORPORATION

ARMCO

Coating formulas containing Calgon*

provide

1. Better pigment dispersion
2. Better coating colors
3. Better surface coatings



HERE'S WHY:

Through the superior deflocculating properties of Calgon, better pigment dispersion is obtained, resulting in better finished coated stock.

Coating colors are superior when Calgon is utilized because the flow properties of the coating color are improved, and because higher solids can be used.

Surface coatings are improved by using Calgon because Calgon provides a better bond between the paper and the coating.

Calgon is useful in the pulp and paper industries in many ways. We would like to show you how and where Calgon can be of service to you. Write, wire or call us today.

GET YOUR COPY OF THIS BOOKLET

CALGON, INC.
Hagan Building, Pittsburgh 30, Pa.

Please send me your bulletin "Calgon and its applications in the Pulp and Paper Industry."

NAME_____

POSITION_____

COMPANY_____

STREET AND NUMBER_____

CITY_____ ZONE____ STATE_____

PT-6

*T.M. Reg U.S. Pat. Off.

HAGAN HALL BUROMIN CALGON

calgon, inc.

A SUBSIDIARY OF HAGAN CORPORATION

HAGAN BUILDING
PITTSBURGH 30, PA.

USE . . .

Thiele Kaolin

HIGH QUALITY PAPER CLAYS

- Controlled Particle Size . . .
- Standardized Low Viscosity .
- Excellent Color . . . . . .
- High Brightness . . . . . .

Write for full information and sample of Thiele Kaolin coating or filler clay for your particular use.

Thiele Kaolin Company

P. O. BOX 270 · SANDERSVILLE, GA.

Let's give them a sales plus in COLOR

Notice how colored wrappings liven things up around a store . . . how they establish identification and give free advertising when they're carried *out* of the store! Sell this forceful idea to your prospects and you'll win steady customers for your papers for wrappings, boxes, bags and gummed tape.

Du Pont is well set up to help you. First, we're aiming an advertising campaign to the stores; we're giving top billing to this important thought:

"When the package tells them where people are buying . . . it's COLOR that does the talking!"

And then, we're offering a technical service that will help you select the dyes that suit any kind of business personality, any specific need. For more information, write E. I. du Pont de Nemours & Co. (Inc.), Dyes and Chemicals Division, Wilmington 98, Delaware.

More color makes more business . . . for your customers and you

FOR MAXIMUM ECONOMY
Du Pont basic dyes

FOR MAXIMUM SOLUBILITY
Du Pont acid dyes

FOR MAXIMUM LIGHT FASTNESS
Du Pont dispersed organic pigments:

Monastral Fast Blues*
Monastral Fast Greens*
Lithosol Pigments*

*REG. U. S. PAT. OFF.

Du Pont Dyestuffs

DU PONT

REG. U. S. PAT. OFF.

150th Anniversary

BETTER THINGS FOR BETTER LIVING . . . *THROUGH CHEMISTRY*

News about

B. F. Goodrich Chemical *raw materials*

"DRESS UP" PRINTING SURFACE

-get more advantages...with Hycar

IDEAL as a pigment binder in paper coating, Hycar latex provides an excellent printing surface and good adhesion properties. A better "front" for food packages, display signs, soap wrappers and more uses! No odor—and Hycar is compatible with casein and other resins.

That's just one phase of this versatile material's uses. When paper is impregnated with Hycar latex, its tear and wet strength are improved. Sheets drape smoothly, have a cloth-like feel. There are many uses for this softer, stronger, Hycar-improved paper: protective wrapping, bags, gasketing, tape backing, imitation leather base, shelf covering. More are possible.

And this, too: with Hycar-based adhesives you can permanently bond paper, wood, leather, aluminum foil and vinyl films to themselves as well as to other resins.

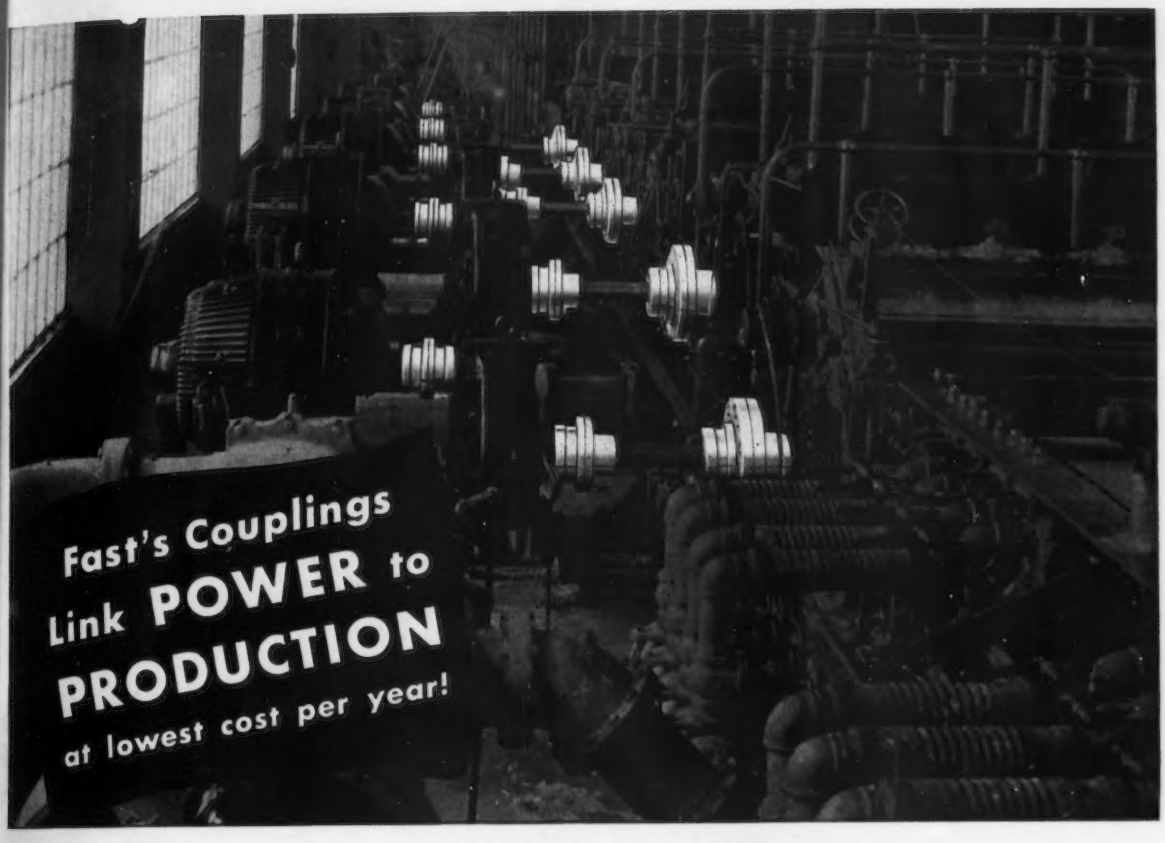
It's easy, safe and economical to use Hycar latex. It may be added to paper before or after sheet formation. No inflammable or hazardous solvents are needed. No costly recovery system or equipment required.

For helpful technical bulletins on the uses of Hycar latex, please write Dept. HM-7, B. F. Goodrich Chemical Company, Rose Building, Cleveland 15, Ohio. In Canada: Kitchener, Ont. Cable address: Goodchemco.

B. F. Goodrich Chemical Company
A Division of The B. F. Goodrich Company

Hycar
Reg. U. S. Pat. Off.
American Rubber

GEON polyvinyl materials • HYCAR American rubber • GOOD-RITE chemicals and plasticizers • HARMON organic colors



Over half a million FAST'S Couplings now in use!

THROUGHOUT the paper industry, Fast's are recognized as the most dependable couplings on the market! Year in, year out, Fast's continue to *outlast the equipment they connect* . . . saving paper mills time, maintenance and money by eliminating costly coupling failures.

When you specify Fast's in your mill, you can forget about coupling worries. Actual cases on record show many Fast's have been in continuous operation for 25 or 30 years without trouble. *And every major producer of high-speed equipment now uses Fast's Couplings!*

KOPPERS® **FAST'S** THE ORIGINAL GEAR-TYPE **Couplings**

INDUSTRY'S STANDARD FOR 32 YEARS

For complete information, with drawings, specifications and photographs, write for our free catalog. Address your letter to: KOPPERS COMPANY, INC., *Fast's Coupling Dept.,* 276 Scott St., Baltimore 3, Md.

Here's How FAST'S Save You Money

Free Service—Koppers free engineering service assures you the right coupling for the job.

Rugged Construction—Fast's still maintains its original design, without basic change or sacrifice in size or materials. Result: freedom from expensive coupling failures.

Lowest Cost per Year—Fast's Couplings usually outlast equipment they connect. Their cost may be spread over many years!

KOPPERS COMPANY, INC., *Fast's Coupling Dept.,*
276 Scott St., Baltimore 3, Md.

Gentlemen: Send me Fast's Catalog which gives detailed descriptions, engineering drawings, capacity tables and photographs.

Name.....

Company.....

Address.....

City..... *Zone*..... *State*.....

From the Filice & Perrelli Canning Co., Inc., Richmond, California, warehouse, an 80-case load is delivered to a terminal across the street.

TOWMOTORS IN ACTION IN U. S. INDUSTRY

quick as a flash...

Towmotor speeds from here to there, inside the plant and out, all day long. Speed handling, production, and deliveries with Towmotor fork lift trucks. For the name of your nearest Towmotor Representative and an illustrated brochure, "Handling Materials Illustrated," write Towmotor Corporation, Div. 17, 1226 E. 152nd Street, Cleveland 10, Ohio.

TOWMOTOR
THE ONE-MAN-GANG®

FORK LIFT TRUCKS AND TRACTORS

RECEIVING • PROCESSING • STORAGE • DISTRIBUTION

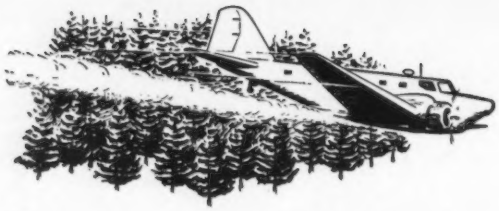
A restatement OF THE WEYERHAEUSER OPERATING POLICIES

The Weyerhaeuser Timber Company is committed to the policy of operating its properties so that they will provide continuous and profitable employment for its workmen . . . and furnish uninterrupted supplies of forest products to the consuming public.

In brief, the basic policies which guide our forestry and mill management practices emphasize, first, recurrent forest yield by tree farming . . . which provides for the growing, protecting and harvesting of trees; secondly, whole crop utilization by grouping different kinds of mills on one mill site . . . which will permit processing all of every log at the mill for maximum use and dollar value.

Augmented by long range research and development programs, these practices will help establish a permanent forest industry . . . the continuous operation of our mills providing greater job security, a reasonable and necessary investment return, and achieving the ultimate objective of assuring quality forest products for use by our customers.

WEYERHAEUSER



Over a million acres have been saved . . . but another million will look like this . . .

if the job isn't finished!

Timber is one of our country's most important crops. And like other crops, it must be protected from the ravages of insects. Tree farmers in the Northwest know this . . . and they know that insects and disease actually do 30% more damage to their tree farms than forest fires do!

That's why Northwest timber owners recently launched a large-scale program to check the infestations of the spruce budworm. Using airplanes and a low-cost, Pennsalt-produced insecticide, they have successfully rescued some 45 billion board feet of lumber that would otherwise have been doomed. Value of the timber: about $785 per acre. Cost of the spraying program: little more than one dollar per acre!

No doubt, similar methods could prove equally effective in ridding other forests of insects and disease. Pennsalt technicians will continue to offer their assistance on this problem from coast to coast.

In the West: **Pennsylvania Salt Manufacturing Company of Washington, Tacoma, Wash. and Portland, Ore.**

In the East: **Pennsylvania Salt Manufacturing Company, Philadelphia 7, Pa.**

Timber is a crop . . . let's protect it

PRODUCERS OF

Liquid Chlorine • Caustic Soda • Bleaching Powder • Potassium Chlorate • Sodium Chlorate • Anhydrous Ammonia • Perchloron® • Sodium Arsenite • Sodium Hypochlorite • Muriatic Acid • Sulphuric Acid • Anhydrous Hydrofluoric Acid • Acid-Proof Cement • DDT • Penco Forest Spray

PENNSALT CHEMICALS

for Industry · Agriculture · Health · Home

What's U. S. Rubber doing in a Northwest paper mill?

Men sort out and extract rejects with pickeroons, often missing and sticking the U. S. Matchless belt with the sharp ends of the pickeroons. The belt has to be able to take it —and U. S. Matchless does.

The conveyor belt gets terrific punishment as the logs pour out of the debarking drums with a grinding, tearing force.

IN THIS Minnesota paper mill, a U. S. Matchless Conveyor Belt carries logs from debarking drums to washing drums. The belt is part of a system to sort and reject improperly debarked logs. The rejected logs are recirculated to the debarking drums on return strand of belt. "U. S." engineers developed a 48" six-ply conveyor belt to withstand this unusually rugged usage.

Here, as in other Materials Handling problems, large or small, United States Rubber Company engineers have contributed to an efficient, economical solution. Whatever your conveying problems are, write to address below.

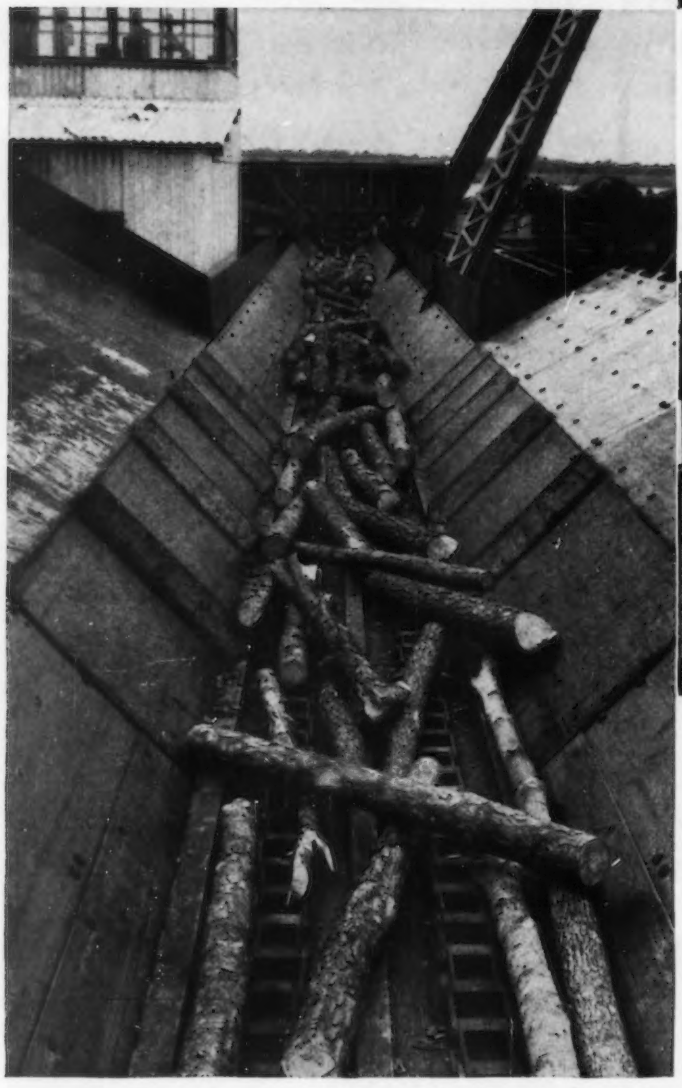
PRODUCT OF U.S. RUBBER SERVING THROUGH SCIENCE

UNITED STATES RUBBER COMPANY

MECHANICAL GOODS DIVISION • ROCKEFELLER CENTER, NEW YORK 20, N. Y.

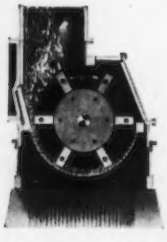
PAPER IS ESSENTIAL

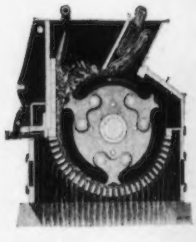
without it we wouldn't be writing to tell you that..



Jeffrey builds quite a lot of equipment used in paper making. We begin with pulpwood handling and follow through each step of the process to the finished paper rolls (see list below). Many companies are cutting costs, speeding production and otherwise running more smoothly because of Jeffrey equipment. We can help you... write us today.

A Jeffrey Belt Conveyor handling chips (above). Chain Conveyor handling pulpwood at the left.





Crushers, pulverizers and shredders for reducing wood, chips, salt cake, pulp lap, etc.

Belt Conveyors **Chain Conveyors** **Log Haul-ups** **Crushers**
Unloaders (Barge) **Re-chippers** **Grinders** **Bucket Elevators**
Chemical Feeders **Transmission Machinery** **Spiral Conveyors**

THE JEFFREY MANUFACTURING COMPANY

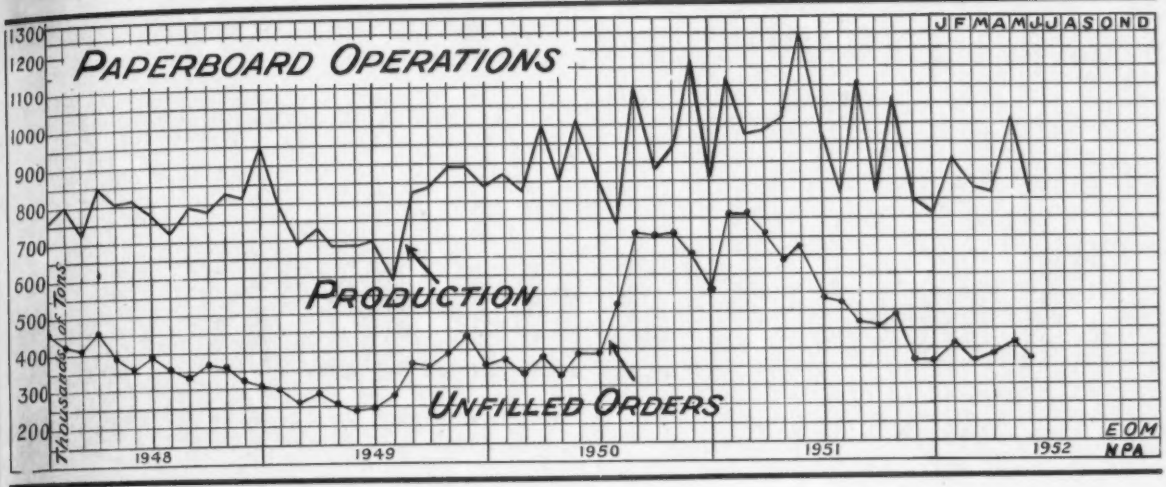
Established 1877

931 North Fourth St., Columbus 16, Ohio

1877 75 YEARS 1952

Baltimore 2 Boston 16 Cincinnati 2 Detroit 13 Houston 2 New York 7 St. Louis 1
Beckley, W. Va. Buffalo 2 Cleveland 15 Forty Fort, Pa. Jacksonville 2 Philadelphia 3 Salt Lake City 1
Birmingham 3 Chicago 1 Denver 2 Harlan, Ky. Milwaukee 2 Pittsburgh 22

Jeffrey Mfg. Co. Ltd., Montreal, Canada
British Jeffrey-Diamond Ltd., Wakefield, England
Jeffrey-Galion (Pty.) Ltd., Johannesburg, S. A.
The Galion Iron Works & Mfg. Co., Galion and Bucyrus, Ohio
Galion (Great Britain Ltd.), Wakefield, England
The Ohio Malleable Iron Co., Columbus, Ohio
The Kilbourne & Jacobs Mfg. Co., Columbus, Ohio



Brief of Important Figures

Source	Production	WEEK ENDING June 14, '52	May 17, '52	June 16, '51
APPA	Paper Production Percent Capacity[3]	90.3	90.2	101.3
	Unbl. Kraft Paper Production Percent	80.9	84.0	94.4
NPA	Paperboard Operating Ratio Percent Inch Hours	86	83	103
		Apr. 1952	**Mar. 1952x**	**Apr. 1951**
APPA	Paper Production* (Except Newsprint and Building Papers) ....Tons	853,000	897,609	831,500
	New Orders ....Tons	797,000	852,639	857,000
	Unfilled Orders ....Tons	812,806	871,956	964,636
	Shipments ....Tons	844,000	882,827	824,000
		May 1952	**Apr. 1951**	**May 1951**
NPA	Paperboard Production ....Tons	806,196	1,002,866	1,251,633
	New Orders ....Tons	751,565	1,049,281	1,264,120
	Unfilled Orders ....Tons	374,989	417,564	658,722
	Our Customers Activities Index[1]	**Latest Mo.°**	**Previous Mo.°**	**Year Ago°**
FRS	Manufactures Total Index	227	228	231
	Durable Mfg. Index	280	280	275
	Nondurable Mfg. Index	184	186	194
	Chemical Products Index	297	298	296
	Mfg. Food Products Index	149	149	149
	Printing and Publishing Index	180	175	179
ODC	Magazine Advg.-Printer's Ink Index	371	369	343
	Retail Sales Combined Adjusted Index	371.8	383.5	368.3
	Drug Index	254.3	260.8	251.8
	General Merchandise Group Index	384.0	407.8	393.9
	Grocery and Combination Index	450.7	449.2	423.8
	Prices Index			
BLS	Consumers Price Index[1]	188.0	187.9	184.5
	Wholesale all Commodities[4]	112.3	112.5	116.5
	Wholesale Processed Foods	109.2	109.5	112.0
	Commodities other than Farm Products and Foods[4]	113.9	114.2	117.3
	Wholesale Pulp, Paper[4] and Allied Products	117.7	118.3	120.3
	Purchasing Power of Dollar, Consumers Prices[1]	53.2	53.2	54.2
	General Activity Index			
FRS	Mfg. Production-Worker Payroll[4]	130.9	131.1	130.0
	Unemployment Compensation Initial Claims (M)	867	890	719
	Miscellaneous Carloadings-Thousands of Cars	1,888	1,463	1,979
	Electric Output (Million KW hr.)	38,568	36,768	36,172
PTJ	Average 32 P & P Common Stocks as of June 21	$34.66	$34.57	$37.26

[1] 1935-39 = 100 Unadjusted Index.
[3] New 6-7 day basis.
[4] New Index 1947-1949 = 100.
° For details see APPA Monthly Statistical Summary—April 1952 Estimated Figures.
° Latest Month Available on Request.
x Revised figures.

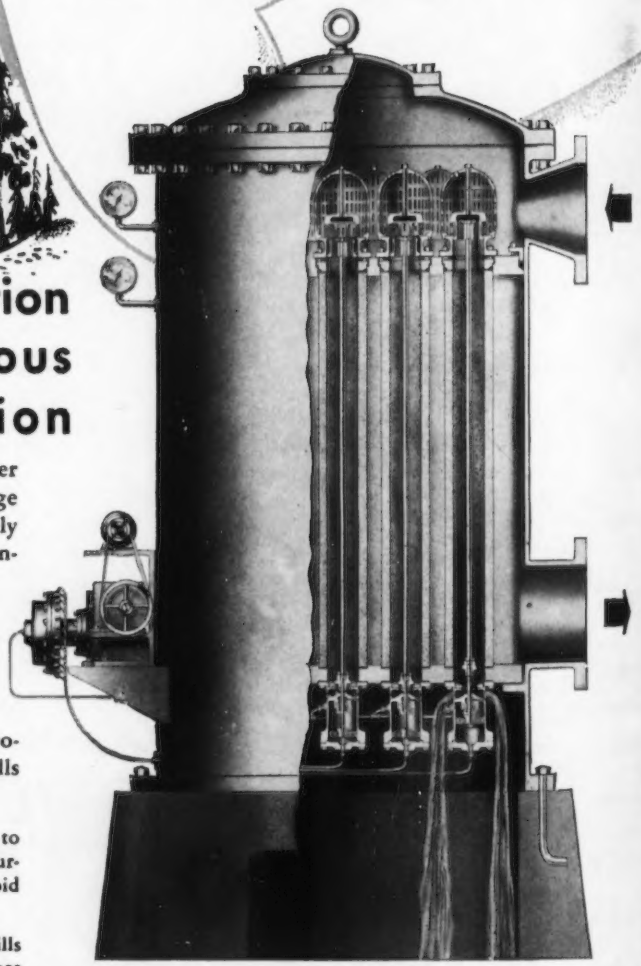
LESS DOWNTIME . .

MORE PAPER

with

ADAMS

AUTOMATICALLY FILTERED WATER



Continuous protection for your continuous machine operation

Higher production goals of today's faster machines must be protected—continuously. Large volumes of water, carrying proportionately larger amounts of impurities, need more attention than ever before.

Clean, automatically filtered water can eliminate down time due to plugged shower nozzles, helps avoid mid-week shutdowns for washing clogged felts.

Experience with Adams Poro-Screen and Poro-Stone Water Filters in pulp and paper mills from coast to coast has proved:

1. Continuous filtration can be relied upon to remove all objectionable impurities, even during seasonal conditions of highly turbid supply.
2. Production continues in Adams-equipped mills when others using the same water source are shut down for cleaning.

Write for your copy of the new 20 page booklet on water filtration in the Pulp and Paper Industry, Bulletin No. 691.

R. P. ADAMS COMPANY, INC.

231 EAST PARK DRIVE, BUFFALO 17, N. Y.

Paper TRADE JOURNAL

TRENDS

Grist from NAPA June Report

Wood Pulp:— "The Canadians will be reluctant to reduce prices because they no longer get any edge on U. S. funds; in fact, they are paying better than 2 percent penalty on them. Canadian newsprint mills are raising their price to $126 effective June 15, and argue that their contracts call for payment in U. S. dollars, whereas their costs are based on Canadian dollars.

"If it were not for this increase in newsprint, we would not hesitate to predict that pulp prices will be easier in the third quarter. Market pulp producers are stockpiling heavily, and dissolving pulp manufacturers would like now to make and sell some paper grades of pulp. In short, we are feeling the effects of less paper production and increased pulp production."

Editorial Comment

Wood Pulp:— At the moment of going to press, Canadian mills had not made known any change in price of unbleached sulfite pulps. Presumably they are still doggedly pursuing their earlier thesis that they will cutback production before they will undermine market stability by adding tonnage to an already soft market.

Stability in the wood pulp market, however, is all but "gone with the wind." But for domestic grades of bleached sulfites which are firm at ceiling prices, prices have been carried down—in many cases close to the breakeven point with costs — by spot offers of distress lots made during the second quarter.

Not that the editors are at all in favor of inflationary prices. And as is often quoted, "What goes up must perforce come down." But the precipitous drops which have been made necessary by market conditions not only do not add to market stability but they are not healthy for planning by producer or consumer.

Created by some who were panicked by a distress lot of pulp, they now become a headache for the whole industry. For on such a market once a lower price is offered, the news spreads like wildfire until the spot offer becomes the new bargaining level. And while it can be said that none can put himself in the other man's shoes and know that he would have done otherwise given identical circumstances, there surely are those times when it is better to charge off a loss today, than to jeopardize one's whole future.

Third Quarter Prices Tumble

To our way of thinking, third-quarter price levels are not an adjustment. Like humpty-dumpty, they have fallen, and it is not going to be easy to recoup the losses.

Unbleached Krafts Weakest in Price

Weakest in price though perhaps not weaker than unbleached sulfites in supply, unbleached krafts are showing a steep drop from second-quarter contract prices.

Forced into competitive range by distress selling, Canadian krafts have been dropped from $140 delivered to $100. Other grades range up to $135, involving two price drops on this grade. First announcement was followed by another which brought the price of this highgrade unbleached kraft to competitive levels at $135 reduced from second quarter levels of $160, it is reported.

Prices of Southern unbleached krafts were not all announced to press time. One grade is known to be meeting the level of the Canadian grade at $100 delivered. Others are expected to name a dip from their $125 second-quarter figure. Its extent is pure guess at the moment.

Overseas unbleached krafts were dropped $30 to $35, on dock level, to make the going price $115/120 for Swedish, $125 for Norwegian. The Finnish figure has not settled to a realistic level yet, but should be named shortly.

Bleached Domestic Krafts Ease

Contrasted with the weakness of unbleached krafts is the comparative stability of bleached krafts.

Adequate in supply by reason of increasing domestic output and lighter demand, this pulp has gradually adjusted to supply-demand factors. It has not been subjected to the distress conditions of the unbleached grade.

Domestic grades range in price from the West Coast brand, which is maintaining its ceiling price of $142, delivered, to about $150 for the best grades of bleached kraft, gradually dropped from second-quarter levels about $15 a ton.

Swedish grades range around $145/150 by brand, reflecting a drop of $40 from last named prices.

Overseas Sulfites Drop $35

Custom-fitted to get themselves into better position in the U. S. market, overseas sulfites — Swedish, Finnish, and Norwegian also dipped $30/35 to the new level of $140, on dock basis, no inland freight allowed.

Unbleached overseas grades are priced in the $125/130 range for the most part, with one brand at $135.

A small tonnage of U. S. unbleached sulfite is priced at $125, the only known offer for domestic.

As previously indicated, Canadian unbleached sulfites are clinging to what most believe is an untenable price of $150/162.50, which is grossly out of line with bleached Canadian sulfites priced at $140/150 with varying freight allowances.

Fine Papers:

"Although prices are definitely in the upper bracket, consumers have become very discriminating and are using cheaper grades of paper wherever possible. This has had a slowing down effect on the consumption of higher grades of paper.

"The merchandise inventories continue to build. This is also true of the mill inventories. Backlogs at the mills have dropped, and shipments have followed suit.

"There is evidence of keener competition among jobbers and mills; so now is the time to "stop — look — and listen" for better qualities, better prices, and better deliveries.

"As to inventories, they should be kept within immediate requirements as there is no particular need for extra inventory at this time."

Commentary:

Though slowed pace is pretty general in the fine paper and book paper fields, there are exceptions. Unusually strong demand is still reported by top grades of bonds, coateds and offsets.

In other grades, supply is everywhere abundant with the mills now seeking Government bids. Records indicate that the number of bids filed with GPO for third-quarter requirements was at a record high, though the tonnage required was only slightly higher than that for the year's second quarter.

Casein Market Still Confused

General uncertainty as to the direction in which the Congress will ultimately move in regard to import restrictions on casein and other products adds to the confusion in this market. To press time, it appears that the bill will impose some sort of further controls in which casein will be included.

Mills are reported to have been purchasing their requirements only for the next 60 days and scheduling shipments to arrive before the end of June when the import quota system ends.

Pricewise the Argentine product is at what looks like an extremely low figure of 15c duty paid New York. Triangular exchange deals may make it possible to obtain slightly lower prices, before the exchange speculation is corrected, importers say.

—E.P.N.

Paperboard Production (Tons)*

	June 14 1952	June 7 1952	June 16 1951
Production	208,998	185,107	243,313
New Orders	192,889	244,912	195,953
Unfilled Orders	393,133	412,083	649,604
% of Activity	86	75	103

* Source: National Paperboard Assn.

3 new features

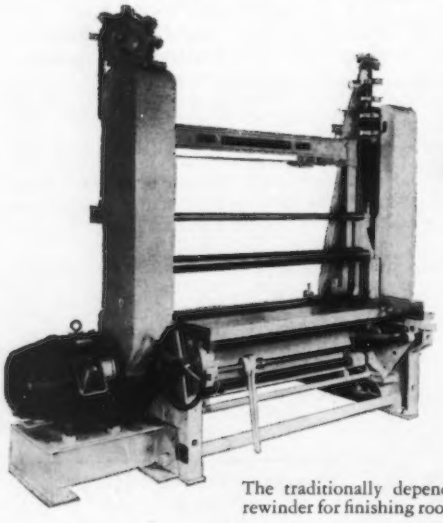
for improved roll quality and reduced maintenance cost

These three new design features of the Camachine Commander virtually eliminate vibration and provide for superior strip control:

1. **Riding Roll Drive:** Impregnated woven flat belts and crowned pulleys drive the riding roll from *both* ends. Adjustable tension apparatus automatically establishes *equal* tension on *both* riding roll belts, and permits variation of riding roll torque to suit the material characteristics.
2. **Rewind Shaft Bearings:** The rewind shafts are mounted in ball thrust bearings which are contained in sliding carriages in the vertical guide bars. The carriages are fitted to eliminate end play of the shafts.
3. **Rewind Drum Drive:** Positive toothed belts, which require no lubrication, are used to transmit driving power to the front and rear rewind drums.

For complete details on the new Camachine Commander write for Bulletin 2000.

CAMERON MACHINE CO. • 61 Poplar Street, Brooklyn 2, N. Y.



The New CAMACHINE COMMANDER TYPE 10

•

Speeds up to 2000 FPM

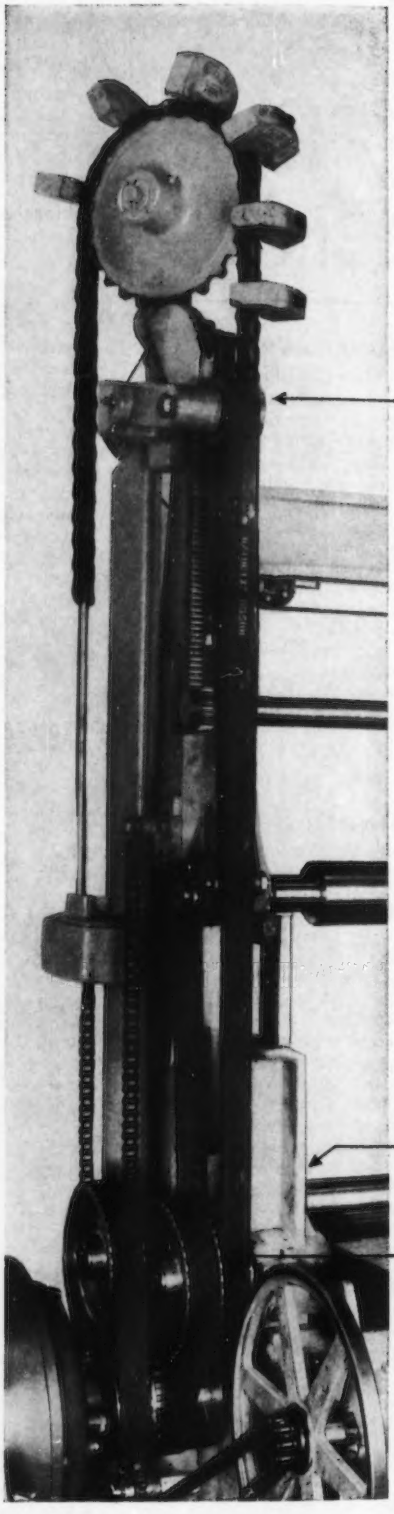
•

Widths from 42" to 82"

•

Rewind dia. up to 40"

The traditionally dependable heavy-duty slitter-rewinder for finishing rooms and converting plants.



LOOK FOR ENGINEERING LEADERSHIP AND YOU'LL WIND UP WITH Camachines®

AA-258

Week of Paper TRADE JOURNAL June 27, 1952

Calling All Publishers and Mr. Celler

Newsprint Price Furor Debunked

NEW YORK — Information came to light last week with an involuntary assist from OPS Administrator, Governor Ellis G. Arnall, which debunks the uproar over the recent $10 rise in the Canadian newsprint price. Also it serves to ask a pointed WHY? of U.S. newsprint publishers and Representative Emanuel Celler, who described U.S. publishers as "helpless" in the face of the newsprint rise.

Chairman of the House judiciary subcommittee which called upon the Department of Commerce to look into the matter of increasing U.S. newsprint production because of its concern over Canadian price rises, Mr. Celler has pursued the subject of newsprint diligently for some years.

Speaking at the Statler Hotel, Washington, D. C., on June 18, to the National Conference of Business Paper Editors, on the fight against inflation, Governor Arnall listed Canadian newsprint among the commodities which are on the rise in price. Asked if he would permit U.S. mills to lift their price $10 to meet the Canadian level, the OPS Administrator said he had been informed that 90% of the producers of domestic newsprint could raise their price at least $10 a ton without piercing the OPS ceiling, one mill can raise it $7, and that the remaining three cannot move at all.

OPS Confirms

Supporting the Governor's statement is information supplied by Office of Price Administration, Forest Products Division, Washington, D. C.

Pricing under the requirements of CPR 22, eight mills, representing 90 percent of domestic output, have ceiling prices which are more than $10 above the current U.S. market price.

The bulk of the U.S. industry, therefore, could meet the $10 price increase of Canadian mills without any action on the part of OPS.

Of the four mills whose ceilings will not permit them to meet the new Canadian price, one mill could lift its price by $7. The other three have ceilings at least $10 below the new Canadian level.

Approved OPS Ceiling Prices for U. S. Newsprint Mills

*Coosa River	$137.25
Crown Zellerbach	
West Linn	122.72
Port Angelus	128.77
Great Northern	153.00
*Inland Empire	153.00
#1 Millwood	114.40
#2 Millwood	116.44
*Pejebscot	114.92
*Publishers Paper Co.	157.34
*St. Croix	163.85
*Southland	128.41
Shawano	210.00
*West Tacoma	135.48

The asterisk (*) indicates the mill is either wholly publisher owned, is partially-owned, or has publisher money invested in it.

No Tailored Newsprint Ceilings

Dollars-and-cents, so-called tailored, ceilings for the domestic industry had been considered, OPS informed, but in view of the fact that so many mills are selling below approved ceilings, such action was hardly feasible.

New York contract price for domestic newsprint has not currently been moved from the $116 level to which it was advanced last Fall. Coosa River alone is reported to have mentioned price considerations. In a statement released after the meeting of the company's directors on May 27, A. G. Wakeman, executive vice-president, stated that "no action was taken relative to the price of newsprint." Coosa River's ceiling price permits a rise. Using the Price Administrator's phraseology, if the newsprint mills have a ceiling which permits a lift in price, and they feel a general advance serves their best interest, we reckon they'll advance it.

Why All the Vitriolic Invective?

One question naturally arises: Why should domestic producers not be allowed to lift the selling price without being deluged by a barrage of vitriolic invective from the press?

The daily press is invited to copy.

—E.P.N.

Newsprint Mfrs. Hold Special Conference

High investment and production costs and relatively low returns are the principal problems affecting further expansion of newsprint production in the United States, a special conference of newsprint manufacturers told the NPA.

The conference was called by NPA's Pulp, Paper and Paperboard Division to explore the question of increasing newsprint production in the United States using wood as a basic raw material. An investigation into the feasibility of installing new facilities in areas where newsprint is not now being produced and to give consideration to the use of substitute fibrous materials also was discussed.

The discussion centered around competitive international and economic considerations and the geographical availability of power, water, and supplies of raw material with relation to markets.

Industry representatives advised NPA that technological improvements are continually increasing newsprint production with presently available facilities.

Another spokesman said the prospects for increasing newsprint production through the use of de-inked waste paper are favorable. He thought plants could be located economically in six or seven market areas in the United States.

The possibility of using bagasse and other fibrous materials also was discussed. One spokesman said the practicability of using these materials should be studied further. Other members expressed the opinion that such material would not be competitive with wood.

The availability of softwoods and hardwoods for further expansion of newsprint production was discussed. The group was not prepared to make any estimates as to the quantity of newsprint that might be made from hardwoods.

The conference is one of several which will be held to examine factors involved in expanding newsprint production in the United States.

Lyall Tracy of NPA's Pulp, Paper and Paperboard Division presided.

33rd Annual Superintendent's Meeting Features Employee and Management Cooperation

The 33rd Annual Convention of the American Pulp and Paper Mill Superintendents Assn. began unofficially with the opening of registration on the ballroom floor of the Sheraton-Cadillac Hotel, Detroit, Mich., on June 16th.

At 7:00 P.M. of the same day, the Industrial Affiliates held their annual dinner and business meeting, at which W. K. Metcalfe, Industrial Affiliates Chairman, presided. The guest speaker at this meeting was Mr. Lenn Redman who described some of the techniques of cartooning and made a few sketches of individuals.

Louis Miriani
Acting Mayor of Detroit, delivers address of welcome.

Walter B. Morehouse
Chairman of Industrial Affiliates

The adoption of a new constitution marked the 11th Annual Dinner Meeting of the Industrial Affiliates Committee.

Walter B. Morehouse, vice-chairman for the past year, was elected chairman for the coming 1952-53 year. Other members of the affiliates committee are R. Burke Morden, 1st vice-chairman, Morden Machines Co.; J. C. Mathews, 2nd vice-chairman, Wm. Cabble Excelsior Wire Mfg. Co.; David DeZurik, DeZurik Shower Co.; Harold Burrows, Raybestos Manhattan; Vance Vallandingham, Kelco Co.; L. E. Egan, F. Egan Co.; John Chandler, Buffalo Pump; L. G. Durant, Pandia Corp.; F. E. Rosenstiehl, Texas Co.; W. K. Metcalfe, J. O. Ross Eng. Corp., ex-officio.

The field representatives of the Industrial Affiliates for the various divisions of the Superintendents Assn. for 1951-52 are as follows: C. I. Horton, R. T. Vanderbilt Co., representing the Connecticut Valley Division; Tany Agronin, Shartle Brothers Machine Co., representing the Miami Valley Division; Howard L. Vanderberg, A. E. Staley Mfg. Co., representing the Michigan Division; Don Hall, Eastwood-Neally Corp., representing the Northeastern Division; Frank McBrearity, Raybestos-Manhattan, Inc., representing the New York-Canadian Division; C. Y. Cain, Hooker Electrochemical Co., representing the Northwestern Division; J. M. Wilcox, Electric Steel Foundry Co., representing the Pacific Coast Division; John Dieffenderfer, Hercules Powder Co., Inc., representing the Pennsylvania-New Jersey-Delaware Division; George Hardaker, Lockport Felt Co., representing the Southeastern Division; George Withan, Orr Felt & Blanket Co., representing the Southern Division.

The general sessions of the 1952 meeting of the American Pulp and Paper Mill Superintendents Assn. got underway promptly after the formal opening by Glen Sutton, president.

Glenn Sutton
Retiring President

Gordon K. Singletary
New President

Donald R. Dick
First Vice-President

W. K. Metcalfe
Toastmaster at Tuesday luncheon

This first morning session had as a theme "The Paper Industry on Parade," and marked a change from previous meetings by devoting its time to Industrial Relations, the financial aspects and community relations program of the paper industry.

The morning session programs were as follows: 9:30 A.M., opening session (Grand Ballroom), *Call to Order*—Glen Sutton, Sutherland Paper Co., Kalamazoo, Mich.; *Invocation*—Dr. E. Shurley, Johnson, Central Methodist Church, Detroit, Mich.; Address of Welcome—Louis C. Miriani, Acting Mayor, City of Detroit; Response—Charles H. Reese, Nekoosa-Edwards Paper Co., Port Edwards, Wis. 10:15 A.M., *General Conference* (Grand Ballroom), Forum; The *Paper Industry on Parade;* Chairman—Glen Sutton, Sutherland Paper Co., Kalamazoo, Mich.; Co-Chairman—W. K. Metcalfe, J. O. Ross Engineering Corp., New York, N. Y.; *Our Experience with Three Weeks of Open House*—Charles R. Seaborne, Thilmany Pulp & Paper Co., Kaukauna, Wis.; *Financial Aspects of Paper Mill Operation*—Milton J. Hayes, The American National Bank and Trust Co., Chicago, Ill.; *Industrial Relations and the Mill Superintendent*—C. F. Raber, American Box Board Co., Grand Rapids, Mich.

Charles H. Reese
Nekoosa-Edwards Paper Co., Port Edwards, Wis., delivered response to address of welcome.

The first luncheon was highlighted by a masterful address by Allen Abrams of Marathon Corp.

Dr. Abrams, a scientist well-known to the industry outlined the effect of our current creeping socialism on the coming generation and its destruction of the principles of America.

Harry E. Hadley
Second Vice-President

The complete text of Dr. Abrams paper will be found in this issue. W. K. Metcalfe, Industrial Affiliates chairman, presided at this luncheon.

New Officers

A short business session followed. The trustees and directors were all elected for the coming year. The officers for 1952-53 are President, Gordon K. Singletary, Brunswick Pulp & Paper Co.; First Vice-President, Donald R. Dick, Howard Smith Paper Mills Ltd.; Second Vice-President, Harry E. Hadley, The Gardner Board & Carton Co.; Third Vice-President, Howard H. Street, National Vulcanized Fibre Co.; Fourth Vice-President, Martin J. Auchter, Hoberg Paper Mills; Fifth Vice-President, A. E. Bachmann, Missisquoi Corp.

The following trustees were all re-elected, Fred C. Boyce, Milwaukee, Wis.; William N. Brydges, Lynchburg, Va.; Raymond L. Barton, Plainwell, Mich.; Howard Harrison, Middletown, Ohio and Roy H. Kelly, Rothschild, Wis.

M. J. Auchter
Fourth Vice-President

1952 Convention at Atlanta-Biltmore

It was announced that the 1953 convention will be held June 9-10-11, 1953 at the Atlanta Biltmore Hotel, Atlanta, Ga., following the custom of holding the meeting within the president's home territory.

Human Engineering

The second session following the luncheon was based on Human Engineering, a major problem of superintendents of this era. Sidney Ferguson, President of the American Paper and Pulp Assn. discussed the broad responsibilities of management, followed by Paul L. Phillips, President of the International Brotherhood of Paper

Allan Hyer
Bagley & Sewall Co., speaker at conference on "Trade Conditions."

C. F. Raber

American Boxboard Co., Grand Rapids, Mich. speaker at first general conference.

Makers. Mr. Phillips discussed the problems of unions and the superintendents and made many forceful points concerning problems of the production team.

He paid tribute to "Daddy" Boyce, who not only founded the Superintendents Association but also was a founder of the present Paper Makers Union A. F. of L., a fact little known to the present generation of paper makers.

Robert A. Huston, a former paper maker, followed with an excellent presentation on "Getting Employees to Think" again a major headache of industrial management.

Phillip J. Bowen concluded the first day's session by developing "The key to the safety program is the foreman, regardless of how sold the top brass may be on safe working conditions."

A. E. Bachmann, Mississquoi Corp. and A. W. Plier of D. J. Murray Mfg. Co. were co-chairman of the afternoon session of June 17th.

Technical Forum and Mill Visits

The second days formal sessions started with a moving conference devoted to supply problems. Allen Hyer lead off with a discussion on machinery. This was followed by an analysis of the chemical situations by a panel of suppliers headed by Walter Morehouse.

A. E. Bachmann

Fifth vice-president

Tuesday P.M. conference on Human Engineering, L-R—A. E. Bachmann, chairman; A. W. Plier, co-chairman; Speakers, Sidney Ferguson, president APPA; Paul L. Phillips, president, International Brotherhood of Papermakers; Robert A. Huston, Fuller Mfg. Co.; Phillip J. Bowen, Great Lakes Steel Corp.

Syracuse Alumni Breakfast, Wednesday A.M. L-R—Baxter Chamberlain, Jack McKela, Walter Morehouse, Louis Taylor, James Lyon, Vernon Woodside, Larry Woodside, Harry Weston, Tony Agronin, Ned Root, Carl Gehring.

Guests of Wadhams Div., Socony-Vacuum Oil Co. at the all Wisconsin Breakfast, Wednesday A.M.

Panel on Trade Conditions of Chemical Suppliers, L-R—Vernon Woodside, Mathieson Chemical Co.; Frederick A. Soderberg, General Dyestuff Co.; W. B. Morehouse, Nopco Chemical Co. Panel Chairman; John Walsh, American Cyanamid Co.; A. J. Sippola, Socony Vacuum Oil Co.; M. M. Bixby, Hercules Powder Co.

Thursday A.M. Sulphite Conference, L-R—John N. Cadaret, Wayne University; C. N. Hager, Pulp and Paper Division, Diamond Match Co.; Gordon Morseth, Detroit Sulphite Co., Chairman; John A. Minser, Crane Co., Co-Chairman; J. K. Perkins, Improved Paper Machinery Co.

Audience participation entertainment at Thursday A.M. Wake-em-up Breakfast shows Ollie Callighan and R. B. Martin watching blindfolded Mrs. Sam Hodge being kissed by her husband.

Thursday session on Paperboard, L-R—Warren W. Macklem, Black Clawson Co.; Harry Hadley, Gardner Board and Carton Co., Chairman; B. E. Sooy, Gardner Board & Carton Co.; Sam Weber, Black Clawson Co., Co-Chairman; George Greenwood, L. Scott.

Thursday A.M. Kraft Pulp Session, L-R—R. C. Bullock, Ecusta Paper Corp., Chairman; Tany Agronin, Shartle Bros. Co.; Sven Fahlgren, 3ird Machine Co., Co-Chairman; Vernon Woodside, Mathieson Chemical Co., Co-Chairman; R. H. Worrell, Southland Paper Co.; Malcolm Pineo, Brunswick Pulp and Paper Co.

E. P. Gillan, Anheuser-Busch, Inc. and Gordon K. Singletary, Brunswick Pulp & Paper Co., co-chairmen of the Wednesday A.M. general conference on Trade Conditions.

The following were members of this panel: Bob Sherman, A. E. Staley Co.; Fred Soderberg, General Dyestuff Corp.; M. M. Bixby, Hercules Chemical Co.; O. Callighan, Edgar Bros. Co.; J. Dunn, Dow Chemical Co.; A. I. Sippola, Socony-Vacuum Oil Co.; John Walsh, American Cyanamid Co.; Vernon Woodside, Mathieson Chemical Co.

A pulp requirements roundup, by James Ritchie, concluded the session.

The second afternoon was devoted to mill visits, and the annual golf tournament which was held at West Shore Golf and Country Club, Grosse Isle, Mich.

The evening program started with the annual affiliates get-together party followed by dinner in the Grand Ballroom. Ford C. Frick, Baseball Commissioner, successor to Happy Chandler, was the feature speaker.

At 8:00 A.M.; Thursday morning, June 19th, a "Wake-em-Up" breakfast was attended by both men and women.

At the conclusion of the breakfast entertainment, about 10:00 A.M. four simultaneous technical sessions were conducted as follows: Sulphite—Chairman—Gordon Morseth, Detroit Sulphite Pulp & Paper Co., Detroit, Mich.; Co-chairman—John A. Minser, Crane Co., Chicago, Ill.; *Sulphite Superintendents-Thinkers, or Stinkers?*—John N. Cadaret, Wayne University, Detroit, Mich.; A Few Thoughts on the

Ford Frick

Commissioner of Baseball, guest speaker at Wednesday P.M. Dinner.

Casey Stengel

Manager of New York Yankees, guest speaker at Wednesday P.M. Dinner.

Pitch Problem—C. N. Hager, Jr., Pulp and Paper Division, Diamond Match Co., Plattsburg, N. Y.; *Valveless Vacuum Decker—Its Construction and Performance*—J. K. Perkins, Improved Paper Machinery Corp., Nashua, N.H.

Kraft Session

Chairman—R. C. Bullock, Ecusta Paper Corp., Pisgah Forest, N. C.; Co-chairman—Sven Fahlgren, Bird Machine Co., South Walpole, Mass. and Vernon Woodside, Mathieson Chemical Corp., New Orleans, La.; *The Importance of Liquid Volume and Liquor Concentrations on Kraft Pulping*—R. H. Worrell, Southland Paper Mills, Inc., Lufkin, Texas; *Variables in Kraft Pulping*—Malcolm Pineo, Brunswick Pulp & Paper Co., Brunswick, Ga.; *Further Developments in Equipment for Preliminary Refining of Kraft*—Tany Agronin, Shartle Bros. Machine Co., Middletown, Ohio.

Paperboard Session

Chairman—Harry E. Hadley, The Gardner Board and Carton Co., Middletown, Ohio; Co-chairman—Sam Weber, The Black-Clawson Co., Hamilton, Ohio; *What's Wrong with Paperboard?*—Peter R. Scott, C. B. Cottrell & Sons Co., Westerly, R. I.; Robert Gair's Trainee Program—G. B. Greenwood, Robert Gair Co., Inc., New York, N. Y.; *Quality Control Procedures*—B. E. Sooy, The Gardner Board and Carton Co., Middletown, Ohio; *Crownless Press Rolls*—Warren W. Macklem, The Black-Clawson Co., Hamilton, Ohio.

Thursday P.M. Paper Converting Conference. Left, Chairman Howard Street, National Vulcanized Fiber Co.; Speaker Frank Egan, Frank Egan Co.; Right, Co-Chairman, Ray Thompson, Samuel M. Langston Co.

Thursday A.M. session on Plant and Power Engineering, L-R—R. J. Weesner, The Louis Allis Co.; J. L. Van Nort, Reliance Electric Co., co-chairman; J. R. Curtis, Scott Paper Co.; W. C. Bloomquist, General Electric Co.; Albert Sherwood, Sutherland Paper Co., Chairman; LeRoy J. Bauer, Pulp and Paper Division, Pierce Consulting Engineering Co.

Thursday P.M. Conference on Production Methods. L-R—James Thornton, Downingtown Mfg. Co.; L. A. Kramer, Victor Chemical Works; Hoke Martin, Hercules Powder Co., Co-Chairman; Donald Dick, Howard Smith Paper Mills, Chairman; R. F. Merwin, Eriez Mfg. Co.; A. W. Huberty, Oliver United Filters, Inc.

Thursday P.M. Conference on Paper Machines. L-R, Jack Buechler, Beloit Iron Works; L. G. Janett, J. O. Ross Engineering Corp.; Raymond L. Barton, Michigan Paper Co., Chairman; J. H. Rediske, Hanford Atomic Energy Works; D. R. Simonds, Beloit Iron Works; Robert A. Miller, Kalamazoo Vegetable Parchment Co.

Thursday P.M. Conference on High Yield Pulping. L-R, L. W. Murfeldt, Consolidated Water Power and Paper Co., Chairman; S. I. Aronovsky, Northern Regional Research Laboratory; J. A. Hall, Forest Products Laboratory; Romulus S. Von Hazmburg, U. S. Gypsum Co.

Plant and Power Engineering Session

Chairman — Albert Sherwood, Sutherland Paper Co., Kalamazoo, Mich.; Co-chairman—J. L. Van Nort, The Reliance Electric & Engineering Co., Cleveland, Ohio; *Electrical Adjustable Speed Drives in the Pulp and Paper Industry*—A. W. Harrington, W. J. Altschwager, A. E. Dillonaire, H. L. Kelley, T. J. Ethier, and R. J. Weesner, The Louis Allis Co., Milwaukee, Wis.; *Making the Equipment Installation*—LeRoy J. Bauer, Pulp and Paper Division, The Pierce Consulting Engineering Co., Boston, Mass; *Increased Production from Existing Machines*—J. R. Curtis, Scott Paper Co., Chester, Pa.; *The Gas Turbine for Mill Power and Steam Requirements*—W. C. Bloomquist, General Electric Co., Schenectady, N. Y.

There was no scheduled luncheon on Thursday, and the afternoon sessions began at 2:00 P.M. as follows: High-Yield Pulping — Chairman — L. W. Murtfeldt, Consolidated Water Power & Paper Co., Wisconsin Rapids, Wis.; Co-chairman—R. G. Goodwin, Pandia, Inc., New York, N. Y.; *Today's Semichemical Pulp Industry*—J. A. Hall, Forest Products Laboratory, Madison, Wis.; *The American Paper Industry Needs Straw and Bagasse*—S. I. Aronovsky, Agricultural Residues Division, Northern Regional Research Laboratory, Peoria, Ill.; *Roofing Felt Yesterday and Today*—Romulus S. von Hazmburg, United States Gypsum Co., Chicago, Ill.

Paper Converting Session

Chairman—Howard N. Street, National Vulcanized Fibre Co., Yorklyn, Del.; Co-chairman—Ray A. Thompson, Samuel M. Langston Co., Camden 4, N. J.; *Impregnating and Coating of Specialty Papers* — Frank W. Egan, Frank W. Egan & Co., Bound Brook, N. J.; *Processing Soft Papers*—Cletus Wetli, Hudson-Sharp Machine Co., Green Bay, Wis.; *Paper Characteristics for Laminating*—K. W. Osborne, The Ohio Boxboard Co., Rittman, Ohio; *Some Fundamentals of Good Package Design*—Rex Paxton, Sutherland Paper Co., Kalamazoo, Mich.

Production Methods Session

Chairman—Donald R. Dick, Howard Smith Paper Mills, Ltd., Cornwall, Ontario, Canada; Co-chairman — Hoke Martin, Hercules Powder Co., Kalamazoo, Mich.; *Polyphosphates in the Paper Industry*—L. A. Kramer, Victor Chemical Works, Chicago, Ill.; *The Tramp Iron Problem in the Paper Industry*—R. F. Merwin, and R. C. Hoff, Eriez Mfg. Co., Erie, Pa.; *Clean Up Methods as an Aid to Slime Control*—J. H. DeGroff, Buckman Laboratories, Inc., Memphis, Tenn.; *Up-Flow Screening of Chemical Pulp*—A. W. Huberty, Oliver United Filters, Inc., Chicago, Ill.; Downingtown Masson-Scott Cutter—a film—James Thornton, Downingtown Mfg. Co., Downingtown, Pa.—Commentator.

Paper Machines Session

Chairman — Raymond L. Barton, The Michigan Paper Co. of Plainwell, Plainwell, Mich.; Co-chairman — A. Stewart Murray, Beloit Iron Works, Beloit, Wis.; *New Design of Fourdrinier Wet End* — Jack Buechler, Shartle Bros. Machine Co., Middletown, Ohio; *Dryer Felts in Relation to Paper Drying*—L. G. Janett, J. O. Ross Engineering Corp., Chicago, Ill.; *Inlets and Slices*—D. R. Simonds, Beloit Iron Works, Beloit, Wis.; *How to Calculate Cost of Down Time on Paper Machines*—Robert A. Miller, Kalamazoo Vegetable Parchment Co., Parchment, Mich.; *Uses and Applications of Nuclear Traces in the Paper Industry*—J. H. Rediske, Hanford Atomic Energy Works, General Electric Co., Richmond, Wash.

The morning session on Paperboard was continued during the afternoon.

The meeting was climaxed on Thursday evening by a banquet at which Glen Sutton, president of the Association, was toastmaster. During this affair the chair was turned over to the new president, Gordon Singletary, by Mr. Sutton. As usual the banquet was followed by dancing until ?.

Concluding Sessions

The sessions on the last day as described above were devoted to new developments and operating problems covering a wide range of topics. From the attendance and comments heard, the shift from deep technical discussions to human and production problem discussions was well received and bids well to make future programs of greater value to operating men in the mills.

A new policy of having no entertainment in rooms during business hours also is a step in the right direction.

There were several special affairs at off hour times. The "All Wisconsin Breakfast" drew a large group, upon invitation of Messrs. Baumgartiner, Lauterbach and Wake of Wadhams Division of Socony Vacuum Oil Co., Inc.

The Loyal Sons of New York State College of Forestry met for their annual breakfast meeting and made plans for the years' activities.

Convention Committees

The convention committee in charge of all arrangements consisted of Glen Sutton, General Chairman and Harry E. Weston, Convention Manager. Glen Sutton was Chairman of the Hospitality Committee. He was assisted by Gordon K. Singletary, Donald R. Dick, Harry E. Hadley, Howard H. Street and Martin J. Auchter. The Ladies Committee consisted of Mrs. Glen Sutton, Chairlady; Mrs. Gordon K. Singletary, Mrs. Harry E. Hadley, Mrs. Howard H. Street and Mrs. Martin J. Auchter. Olin W. Callighan was Chairman of the Entertainment Committee. Alfred B. Perlick was Chairman of the Golf Committee, aided by H. L. Vanderberg and Howard Roderick. Kenneth McClelland was Chairman of the "Wake 'Em Up Breakfast" and Olin W. Callighan, Co-Chairman; Roy L. Davis, Chairman and Paul Burchfield, Co-Chairman of Plant Visits. The Allied Industries Advisory Committee for Ninth Annual Get-Together Party consisted of Norman O. Weil, Chairman; Robert Nivison, Charles Champion, Frank Frothingham, S. W. Fletcher, A. M. Cooper, William E. Buchanan, J. W. Hemphill, O. W. Callighan, Enright Ellis, William Greeley and R. Burke Morden.

About 600 members and wives attended during the three days of the conference. Detroit gave them a hot reception, 96 degrees, the hottest day on record.

The Newsprint Tax Burden

Vernon L. Tipka, Secretary of the Newsprint Service Bureau told the members of the Superintendents Association that "the newsprint industries of Canada and of the United States together will closely approach 7 million tons this year." He further said, "The tax burden borne by newsprint paper ranges from $20 to $30 per ton and is likely to go higher." He pointed out that the government now takes more from earnings on an employee basis that the employee or the company earns and claimed "the capital investment per employee is now over $40,000."

"All-Wisconsin" Breakfast

The "All-Wisconsin Breakfast" was held in the English Room on June 18th. It was sponsored by Wadham's Div. of Socony-Vacuum Oil Co., Inc. The Hosts were, A. J. Baumgartner, H. D. Wake and J. R. Lauterbach. Those in attendance included: Mr. and Mrs. Ray L. Barton, Mr. and Mrs. R. H. Kelly, Fred C. Boyce, Mr. and Mrs. W. H. Brydges, Mr. and Mrs. Glenn Sutton, Mr. and Mrs. Martin Auchter, Harry Weston, Miss D. Stone, W. K. Metcalfe, R. Burke Marden, John Cornell, Al Wilson, Mr. and Mrs. Vince Waters, Geo. Lockwood, Don Zeigler, Mr. and Mrs. H. Perry, R. G. MacDonald, J. H. Lyons, R. J. Cross, Ed Roberts, Mr. and Mrs. R. Bauman, E. C. Jacobi, Les Simser, Mr. and Mrs. W. Mitchell, James F. Lyons, W. M. McGraw, Gus Reidel, W. Jannett, Mr. and Mrs. A. W. Pleir, Mr. and Mrs. C. Durkee, Harry Moore, Cash Whippel, Paul Pringel, O. W. Callighan, Mr. and Mrs. A. I. Sippola, Howard Parker, C. Y. Cain, Paul Baronon, Talbot Peterson, Ray Bennett, Richard Arhens, Ralph Buechler, Don B. Chapman, Mr. and Mrs. H. Chew, R. H. Nugent, Mr. and Mrs. R. H. Peeters, Mr. and Mrs. Paul West, Mr. and Mrs. F. X. Kreiling, Carl Stokes, H. S. Skinner, L. H. Murtfeldt, H. W. Richmond, Mr. and Mrs. Cecil Taylor, Mr. and Mrs. John McPherson, Mr. and Mrs. Otto Harsel, Wm. Relyea and Mr. and Mrs. J. W. Youngchild.

Columbia Reports Success With Meighan Raft

Columbia Cellulose Co. Ltd. is using bundle rafts in log towing in British Columbia waters. Some weeks ago the company took a bundle raft of pulpwood to Watson Island harbor. The million feet of hemlock was towed over 350 miles of stormy water in arriving in perfect condition, according to Rae Johnson, woods manager of the company who inspected the two 500-foot experimental rafts which were taken from Negei Island, south of Queen Charlotte Sound, and were towed by the 100-foot tug Sea Queen of the Dolmage Towing Co. Ltd.

Following this experiment the Columbia Cellulose Co., under its policy of trading cedar logs for pulpwoods, sent 1,500,000 feet of cedar logs to Vancouver in a boom-type raft. This raft is reported to be easier to put together than the Davis raft and some other types which are now used in B. C. for ocean-going tows. The new method requires less gear than the average raft and apparently stands up well during the extensive tow, which during the recent experimental trip encountered gale weather. The Meighan raft, as it is called, is credited to Lloyd Evans, assistant woods manager for Columbia Cellulose Co. It is called after Mr. Meighan who is a partner with William Lyons of Vancouver in the Meighan Fittings Co. The raft involves extra heavy "weaving cables" wound over and under the truck-load size bundle of logs, knitting them together solidly and still leaving enough play for expansion in heavy seas.

Strathmore Honors Veteran Employees

The Strathmore Paper Co., West Springfield, Mass. honored the 210 members of its 25-Year Club at a banquet held in West Springfield recently.

Of the 210 members of the 25-Year Club, 38 are retired and 172 are actively employed. More than a quarter of the company's 656 present employees at its mills in West Springfield and Woronoco belong to the 25-Year Club.

Sues for Patent Infringement

Switzer Bros. Inc. has started an action in the U. S. District Court for the District of Northern Illinois against a number of defendants including Chicago Cardboard, Bradner Smith & Co., Chicago Paper Co., and Swigart Paper Co. for infringement of U. S. patents 2,417,384 and 2,475,529 covering the making of Daylight Fluorescent signalling and Display Device, the selling and using of the same.

Lewis Brownville Moves

After June 16, Lewis Brownville Sales Inc. will be located at 225 Broadway, New York, N. Y.

Dr. T. G. Zentner

Westbrook Steele Gold Medal Goes To Dr. Zentner

Dr. Thomas G. Zentner, who was graduated from The Institute of Paper Chemistry with the Ph.D. degree has been selected from the 1952 class to receive the Westbrook Steele gold medal.

The award, established in 1941 by the president of The Institute, Westbrook Steele, is presented each year by vote of the faculty to the graduate whose doctoral thesis is most outstanding.

Dr. Zentner presented a synopsis of his thesis, "A Study of the Reaction Products of Lignin Model Compounds and Sodium Hydrosulfide," at the recent Institute Executives' Conference.

The medal winner recently accepted a position with the Gardner Board and Carton Co.

Marathon Starts Construction Of Packaging Warehouse

Final phase of a three-year building and equipment expansion program for Marathon Corp.'s food package manufacturing plant at Wausau, Wis., is under way. Foundations were poured for a new shipping and receiving warehouse. Construction schedules call for occupancy by late December.

The addition is being attached to the present building, which was placed in operation in January, 1950. It will permit year-around capacity operation of converting equipment which produces packages for frozen foods, dairy products and perishable bakery merchandise. By stockpiling finished packages, the plant will be able to operate on a steady employment basis, rather than to meet seasonal requirements of the frozen food industry.

Fighting Paper Wanted

Invitations for bids have been issued by the New York Quartermaster Procurement Agency, 111 E. 16th street, New York 3, N. Y., on QM-30-280-52-1927, covering Folders, File, Various, 2,022,100 each. Bids will be opened July 15, 1952 at 11:00 A.M. (EDST) at the New York Office. This procurement is for the U. S. Navy.

Marathon Corp., AFL Unions Sign For One Year

MENOMINEE, Mich. — Members of nine local unions affiliated with the International Brotherhood of Paper Makers and the International Brotherhood of Pulp, Sulphite and Paper Mill Workers (AFL) have accepted terms of a new one-year contract with Marathon Corp.

The agreement, effective May 1, 1952, and terminating April 30, 1953, affects Marathon plants at Menominee and at Menasha, Rothschild, Wausau and Ashland, Wis.

Joint announcement of the new contract was made at conclusion of a series of negotiation conferences participated in by approximately 75 union members and 25 company officials.

Terms of the contract included:

1. A second cost-of-living increase, using January 15 index on a percentage basis, two to seven cents per hour effective January 16, 1952. First cost-of-living increase of four cents per hour went into effect on July 16, 1951.

2. A general increase of two cents per hour effective May 1, 1952. An Additional two cents per hour increase effective November 1, 1952. Total four cents. This increase, however, is subject to WSB approval.

3. Three days off with pay for death in the immediate family.

4. Payment of double time, instead of time and one-half, for hours worked on Memorial Day and Thanksgiving, plus holiday pay. This brings the number of paid holidays to six.

5. The company agreed to extend its hospital and surgical program to retired employes.

6. Veterans officially attending veterans funerals will be allowed three hours off with pay.

7. New male base rates — 6-hour workers, $1.54; 8-hour workers, $1.45; female base rate, $1.30.

8. A one-year labor agreement with one wage reopener at any time during the term of the agreement.

Acceptance of the new contract was announced by Emil Noren, regional vice-president for the paper maker's union; Wellington S. Meyer, international representative for the Pulp, Sulphite and Paper Mill Workers; and Carl R. Geisler, director of personnel for Marathon.

Ireland's Imported Newsprint and Wood Pulp Prices Increase

A table of average c.i.f. prices for imports into the Republic of Ireland during the first three months of 1952, compared with the corresponding quarter last year, which has been issued by the Central Statistics Office in Dublin, shows the following items for paper and paper products—newsprint, £3.21 per cwt., as against £2.24 in the first quarter of 1951; wood pulp £6.01 per cwt., as against £3.12 in the first quarter of 1951.

PEOPLE

Paul Brown

PAUL BROWN, southern divisional retail sales manager, and **Fred L. Witt,** assistant advertising manager, will become assistants to the vice-president in charge of distribution of Scott Paper Co.

Fred L. Witt

Other personnel moves revealed were:—**J. D. Bowden,** formerly assistant to the distribution vice-president, to Seattle as retail divisional sales manager of the northwest sales division; **B. J. Horn,** Dallas retail divisional manager, to the new Houston retail sales division; **H. M. Jones,** chief sales correspondent at Scott's Chester, Pa., office, to Dallas as that area's retail divisional sales manager; **J. E. Stone,** Boston retail district sales manager, to the new Charlotte, N. C., division as retail divisional sales manager; **V. O. Tessier,** assistant to the national retail sales manager, to Detroit as retail divisional sales manager; **P. B. Underkofler,** currently Detroit retail divisional sales manager, to Atlanta in the same capacity.

ROBERT P. LAMPERT has joined the sales organization of Arthur Schroeder Paper Co., Inc., with sales offices at 420 Lexington Avenue, New York. Mr. Lampert spent two years at the Rumford, Maine, mills of Oxford Paper Co.

Franklyn O. Ware

FRANKLYN O. WARE has been appointed to the Chicago Office Paper Sales Division of Brown Co. Mr. Ware has been associated with the Soya Products Division of the Glidden Co. for the past three years as assistant industrial sales manager. He was technical director of the Kalamazoo Paper Co. from 1948 until joining the Glidden Co., and prior to that had worked for the Watervliet Paper Co., on both research and control. He was also in the service for 4½ years, and was commissioned in the field as an army medical administrative officer.

J. E. MANUEL has been appointed general manager of Anglo-Newfoundland Development Co., Grand Falls, Newfoundland. **T. Ross Moore,** has been named assistant general manager; **E. L. Neal,** mill manager; **J. S. Goodyear,** vice-president and secretary-treasurer as well as director of the company. **Philip Gruchy** has retired as general manager of the company but will continue as first vice-president and director.

A. G. HEPBURN has been appointed director of sales of kraft wrapping, asphalt-coated, and laminated kraft paper made at the Tomahawk, Wis., and Jait, Ohio mills of National Container Corp. Mr. Hepburn will make his office at 111 W. Washington street, Chicago, Ill.

MAYNARD J. CUSACK joined Shawnee Paper Mills, Green Bay, Wis. on June 16, as vice-president. Mr. Cusack was formerly Western sales manager for the Riegel Paper Corp. and had been with Riegel for twenty-five years.

FINANCIAL

Penobscot Chemical Fibre Co., Bangor, Maine, and Boston, Mass., has filed a registration statement with the SEC seeking registration of $1,250,000 First Mortgage Bonds, due July 1, 1972, to be offered for public sale through an underwriting group headed by Coffin & Burr, Inc., and Chace, Whiteside, West & Winslow, Inc. The interest rate, public offering price and underwriting terms are to be supplied by amendment. Net proceeds of the stock sale, together with other company funds, will be applied to the company's program of additions and improvements, the cost of which is estimated at $1,350,000.

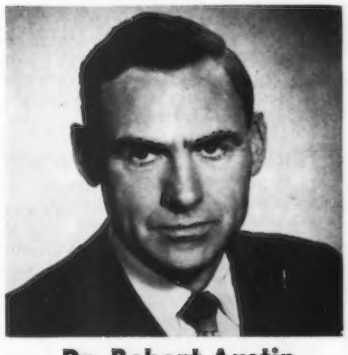
Whiting Corp., Harvey, Ill. declared a cash dividend of 15c per share, payable July 15 to stockholders of record at the close of business on July 1.

Minnesota and Ontario Paper Co. has declared a quarterly cash dividend upon its common stock of fifty cents per share payable on July 25, to shareholders of record at the close of business on June 30.

Price Bros. & Co., Ltd., has declared a dividend of $1 on common, payable August 1 to share holders of record July 14.

Moore Corp., Ltd., has declared dividends of $1.75 in U. S. funds on Classes A and B stock; 25c in Canadian funds on 4 percent preferred stock; 22c in U. S. funds on common stock, all payable October 1 to shareholders of record September 5.

SUPPLIERS



Dr. Robert Austin

BECKMAN INSTRUMENTS reports that Dr. Robert Austin, formerly with Consolidated Engineering Corp., Pasadena, Calif., for four years, has joined Beckman at South Pasadena, Calif., as specialist in the development of titration instruments.

HOOKER ELECTROCHEMICAL CO., Niagara Falls, N. Y. has appointed Herbert K. Holden as salesman in the Niagara sales territory, which comprises western Peunsylvania and New York exclusive of the metropolitan area.

WESTINGHOUSE ELECTRIC CORP. has elected Edward O. Boshell, chairman of the board and president of the Westinghouse Air Brake Co., a director. Mr. Boshell has more than 20 years experience in the public utility field.

GREAT LAKES CARBON CORP. new diatomite plant at Lompoc, Calif., which started production April 4, has reached near full production of filter-aids and fillers. With the exception of the bagging plant, it is completely an outdoor operation.

R. L. Hess, Jr.

RUST ENGINEERING CO. has elected R. L. Hess, Jr. a vice-president. He was formerly secretary of the company.

Mr. Hess came with Rust in 1937 as assistant to the secretary, and was appointed assistant treasurer in 1941. In 1946 he was named secretary to succeed the late Ralph B. Baldridge, and in 1951 was elected to the Board of Directors.

GRAVER WATER CONDITIONING CO., which was removed from Chicago to New York three years ago, has doubled its space at 216 West 14th Street.

WARREN STEAM PUMP CO., INC., manufacturer of pumps, announces the appointment of Process Industries Engineers, Inc., Pittsburgh, Pa., as their representatives on Industrial Sales for the Cleveland, Ohio, area. Arch T. Miller, formerly sales engineer for Patterson Foundry & Machine Co., East Liverpool, Ohio, will be district manager of the Cleveland office, with headquarters at 12417 Cedar Road.

DOWNINGTOWN MANUFACTURING CO. will present a motion picture of the new Downingtown Masson-Scott Cutter as part of the morning program on June 21 at the Belgrade Lakes meeting of the Maine-New Hampshire Section of TAPPI. Accompanying description will be given by Leon E. Smith.

AMERICAN CYANAMID CO., Calco Chemical Division, Dyestuff Department on June 16, 1952, moved their Boston Sales Offices, Laboratories and Warehouse to 1055 Commonwealth Ave. This will be headquarters for their Northern New England personnel.

NOBLE & WOOD manufacturing plant will be closed completely from July 3rd to July 21st. A skeleton crew will be maintained to help customers with any emergency situation which might arise. Production will be resumed July 21st.

Only correspondence and essential office routine will be handled during the two weeks' period.

A. E. STALEY MANUFACTURING CO has established a branch sales office at Chicago. Manager of the Chicago office will be Natt K. Hammer, a representative of the company's industrial sales department in that area since 1945. R. T. Murray, who has been in charge of all grocery products distribution in the Chicago area and has been with the company since 1941, will be assistant manager. The Chicago sales staff of 13 representatives will cover the Upper Peninsula of Michigan, Wisconsin, Northern Illinois and Northern Indiana.

BECKMAN INSTRUMENTS, INC., South Pasadena, Calif., has added Dr. William Ward as research-staff specialist in infrared instrument design. Dr. Ward was formerly a spectroscopist with the Texas Co. in its research laboratory in Beacon, N. Y., and spent almost half of his six years with the Texas Co., specializing in infrared research.

GEIGY CO., INC., New York 8, N. Y., dystuffs and chemical manufacturers, announce that S. S. Harkavy, manager, Paper Department, will leave on July 23rd for an extended trip through Europe. During his trip he will visit the Geigy plants and technical laboratories in Basle, Switzerland and Manchester, England. He will also have the opportunity of inspecting some of the paper plants in the various countries and observing their methods of operation. Mr. Harkavy will return to New York early September.

NATIONAL ANILINE DIV., Allied Chemical & Dye Corp., proposes to build a new chemical plant for manufacture of nitrobenzene and aniline by newly developed continuous processes on a site south of Moundsville, W. Va. The site is adjacent to a new plant of the Solvay Process Division now in the course of construction which will manufacture chlorine and caustic soda using local salt deposits. The new catalytic process for aniline will use hydrogen generated in the Solvay operation.

Construction of National's new plant will start at an early date with completion projected in 1953; work will be directed by the Division's engineering manager, F. J. Krueger. Because of the plant's importance to the defense effort DPA has awarded Certicate of Necessity covering 60% of the cost of the facilities estimated to exceed $2,300,000.

REICHHOLD CHEMICALS, INC. has appointed John M. Jernigan technical service director of the Southern Division in Tuscaloosa, Ala. Until his recent promotion Mr. Jernigan was a chemist in the RCI Southern Division laboratories, specializing in development of synthetic resins for the paper, paint, and plywood industries of the south. Previously he had been a research engineer with the Carbide and Carbon Chemicals Corp. and a consulting engineer with the U. S. Bureau of Mines.

Natt K. Hammer
A. E. Staley Mfg. Co.

R. T. Murray
A. E. Staley Mfg. Co.

Finnish Paper Manufacturer Orders Electrical Equipment

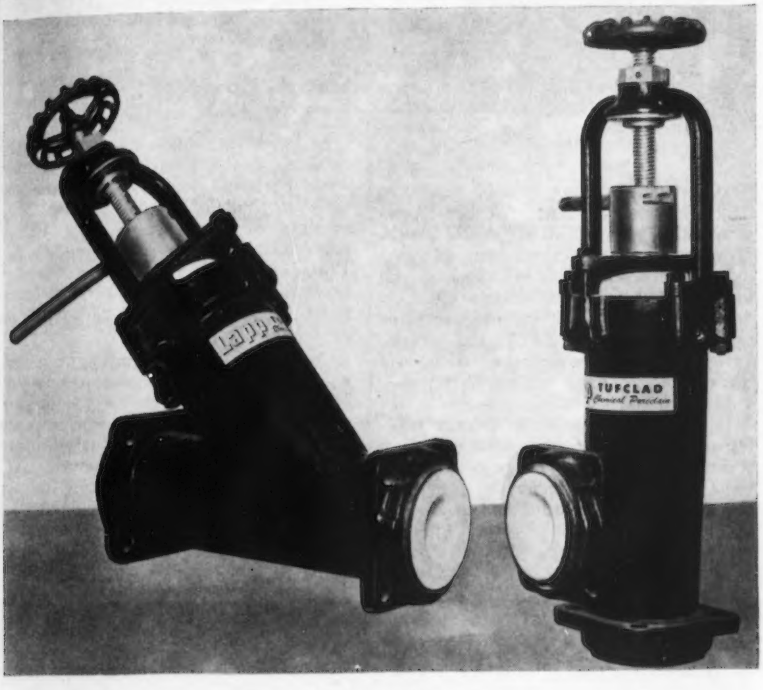
Enso-Gutzeit Osakeyhtio, one of Finland's largest paper manufacturers, has ordered electrical equipment from the Westinghouse Electric International Co. for installation in its paper mill at Kotka.

The order includes a 1250 hp. adjustable-voltage electric drive, two 150 hp. winder drive motors and a number of helper drives. The new equipment will be used to power a light kraft paper making machine which has an annual capacity of 45,000 metric tons.

The electric drive is the third unit of its kind which Enso-Gutzeit Osakeyhtio has ordered from Westinghouse in the past three years. One was placed in operation recently at the company's mill at Kaukopaa, on Lake Saimaa in southeastern Finland. Another is scheduled to begin operation at the Kotka mill in the fall. All are designed to drive paper machines at a speed range of 200 to 2,000 feet per minute.

It will speed the reply to your inquiry to mention Paper Trade Journal.

What's New in Equipment
Supplies and Materials



Armored Chemical Porcelain

Tufclad is the name given by Lapp Insulator Co., Inc., Process Equipment Div., Le Roy, N. Y. to its new line of chemical porcelain armored with fiberglass-reinforced plastic.

The armor is applied in the form of multiple layers of heavy fiberglass woven cloth, impregnated with a special modified phenolic resin of high adhesive strength for bonding to porcelain and between layers of cloth. Jet black in color, the oven-cured armor shell fully covers porcelain, running end-to-end and under flanges.

Advantages of Tufclad armor are said to include the fact that the resilient armor shell acts as a cushion to protect against impact damage in handling or operation — and insulates porcelain against thermal shock. In its own right, the shell is homogenous and tough. It is held to be capable of holding operating line pressures against gross leakage even though porcelain is cracked or broken. Telltale leakage will signal damage, but safely to personnel and loss of product are assured by at least temporary control of lines in case of accident.

Tufclad armoring is regularly available on all Lapp standard Y valves, flush valves, pipe and fittings ½" to 6", plug cocks, safety valves, flush valves, pipe and fittings ½" to 8". In addition, the armoring method makes it readily adaptable to special shapes—tower sections, nozzles, covers, etc. it is stated.

Six-inch Dial Indicator

A newly-designed Dial Indicator for modern instrument panels, also for individual mounting, is released by Taylor Instrument Companies, 95 Ames St., Rochester 1, N. Y.

Primarily developed to meet the requirements of temperature, pressure and load applications in industrial processing, the unit has a high-visibility dial with white graduations and numerals on a black background. Its white wedge shaped pointer or indicator is provided with a micro-adjustment to permit easy and accurate zero setting. A notable feature is the new stainless steel movement designed to eliminate linkage errors.

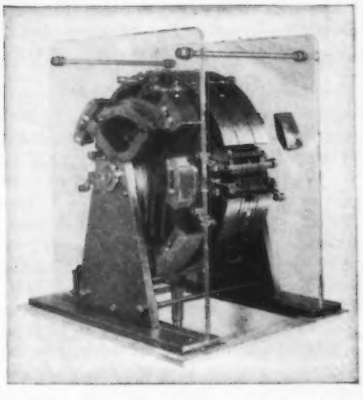
The design of the instrument provides for almost universal actuation by any variable that makes use of a Bourdon spring as an energy to-motion converter. For temperature applications, four different types of actuation are available: Mercury, Vapor, Gas or Organic Liquid (Monolex). Ranges from minus 100 to plus 1200°F. For pressure applications, range spans from 12 to 20,000 p.s.i. are available. Tension and compression load elements can also be built in for load applications with ranges from 0 to 75,000 pounds.

Bulletin 98214 available from Advertising Dept.

Bottom Folding Drum

Illustrated is a display model of the bottom folding drum and cam arrangement from Weber #5 S.O.S. Special Bag Machine made by H. G. Weber & Company, Inc., for Ampco Metal, Inc., Milwaukee, Wis.

The bottom folding drum is held to be an achievement in bag making and in machine design. Bag size changes are quickly made because the various parts and fingers particularly are adjustable, rather than requiring interchangeable parts.



Due to high production speeds required, as well as endurance and margin of safety, Ampco metal is used in all critical parts—such as drum clamps, drum fingers, opening cylinder fingers, center gripper finger holders, and complete cam system.

Equipped with this bottom folding drum and cam arrangement, the #5 S.O.S. has a capacity up to 300 bags per minute and produces a wide range of one- and two-ply self-opening style and satchel bottom bags for packaging such products as sugar, flour, etc.

Pit Baler For Waste Paper

A newly-designed Pit Baler for waste paper and rags has just been announced by E. W. Loeser Company, 1352 Genesee St., Buffalo 11, N. Y.

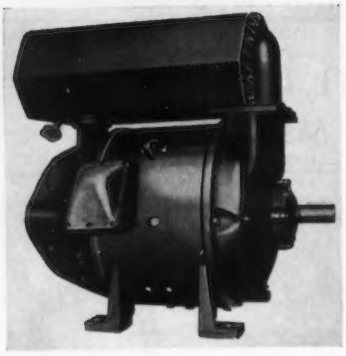
An automatic up-stroke press with hydraulic-mechanical drive, the new unit was built by Firewel Company of Buffalo. This new type of drive com-

bines the advantages of positive mechanical drive with simplified, safe hydraulic action control. It permits the press to operate at a rapid speed in the early stages of compression, and at slower speed with increased pressure as the bale nears completion. This also allows bulky material to vent before final compression, making a firmer bale.

Features are: (1) fluid type coupling between motor and speed reducer minimizes shock and permits motor to attain full speed before taking on load; (2) self aligning, dust-proof and grease tight roller bearings; (3) limit controls at top and bottom of travel confine operation to normal cycle; (4) push button safety hydraulic action control (three station); (5) roller chain, tested at several times operation load; (6) smooth, shockless starting and stopping; (7) heavy reinforced welded construction to prevent bulging. Doors reinforced with 6″ I beams and equipped with safe-type locking mechanism to prevent opening during operation of bale; (8) pit depth to suit requirements; (9) sliding, rolling door to permit loading from second floor; (10) low starting load electric motors. Hydraulic drive reduces current consumed; (11) fully enclosed, including controls, chains, etc., to prevent personal injury; (12) baler is supported by 2-twelve foot U channels, 12″ below floor level—can be hung over a pit or on upper floors.

Dual Motor Totally Enclosed

Reliance Electric & Engineering Co., 1088 Ivanhoe Road, Cleveland 10, Ohio has developed what may be termed a totally-enclosed, dual cooled motor equipped with heat exchanger as an integral part of its frame. A ½ h.p. 3 phase, 60-cycle motor built into the



heat exchanger runs at 3600 r.p.m. to drive internal and external fans independently of the main motor itself. Heat exchanger sections are cast aluminum with both internal and external fins for maximum heat dissipation. Air velocity through the internal sections of the exchanger is 2900 f.p.m. In the external path between the cover and the exchanger bank the air is pumped at 3300 f.p.m.

In addition to the better overall cooling provided, the new motor design provides a number of other advantages. Because cooling efficiency has been increased, use of smaller motors for a given horsepower is possible. This, in turn, permits construction of totally enclosed motors up to 150 h.p.—double the limit previously imposed.

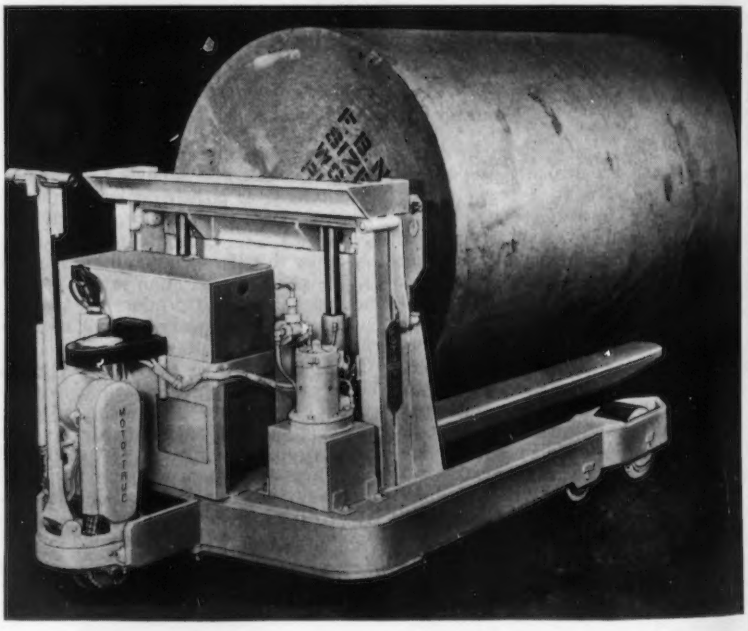
According to Reliance, the new design also simplifies maintenance, since the use of wide exposed aluminum fins, plus the high velocity at which the air is swept past them, tends to keep them clean. Should they become fouled with foreign matter, removal of the cover makes the exposed fins readily accessible for cleaning.

Manually-Operated Pump for Acids

Supplied in hand- or foot-operated models, the Pneumatic Acid Pumps were designed to provide a safe and sane method of acid handling. The product of General Scientific Equipment Co., 27th and Huntingdon St., Philadelphia 32, Pa., they are said to be finding wide usage wherever liquid must be removed from carboy, drum or barrel.

According to the manufacturer, corrosive and other liquids flow smoothly and stop instantly, they come in contact only with the corrosion-resistant tube and cannot affect other parts. When the pump is removed, acid drains completely. No tilting of the container is necessary and danger of a slip, a splash or a spill is minimized.

(Continued on page 48)



Paper Roll Lift Truck

Manufactured by Moto-Truc Co., 1984 E. 59th St., Cleveland 3, Ohio, the new lift truck is specially designed for handling paper rolls. Known as Moto-Truc Model SCB, the unit can be used for box car unloading as well as for general factory and warehouse use.

Truck is powered by an 18-volt battery power unit and has an 8-foot load length. Maximum hydraulic lift is 14 inches. Ten-inch and 7-inch dual load wheels are designed to eliminate the hazard of one set becoming wedged in floor slats. Travel speed loaded is 2½ m.p.h., unloaded 3 m.p.h. "Dead man" controls are standard, with automotive type brake applied to the drive wheel. Truck is designed as a "Walkie" to afford minimum turning radius.

PRICES

The prices below reflect market quotations in New York at the mill level on standard grades. Does not include spot offerings.

PAPER AND BOARD

Standard News, Delivered Ports

Rolls, contract, per ton	$116.00/$126.00
Sheets	131.00/ —

Kraft—per cwt. 50# base wgt. OPS Ceiling CPR 88

F.o.b. Southern & Western integrated mills. C.l. Freight allowed up to $10 a ton.

Standard Wrapping, ctr. rolls	$7.75/ —
Butchers, counter rolls	8.25/ —
Standard Bag, mill rolls	7.50/ —
Shipping Sack, mill rolls	7.75/ —
Gumming, mill rolls	8.00/ —
Asphalting, mill rolls	7.75/ —
Envelope, Sub. 20, mill rolls	9.25/ —

Tissues—per ream 24x36 (480) 10 lbs. 2500 lbs. or more

Wh. No. 1 Frd.	$1.90/$2.05
Wh. No. 1 MG	1.90/ 2.05
Wh. No. 1½	1.80/ 1.90
Wh. No. 2	1.60/ 1.65
Kraft Anti-Tar 20-30	1.90/ —
White Anti-Tar 20-30	2.20/ —

Toilet— per case of 100 rolls—1M sheets

Unbleached 4½x4½	$8.00/$8.25
Unbleached 4½x5, 650 sheets	6.65/ —
Bleached 4½x4½	10.00/12.50
Bleached 4½x5	9.81/10.14
Per Case of 50 rolls—2000 sheets	
Unbleached 4½x4½	$8.00/$9.75
Bleached 4½x4½	6.95/ —
Per Case of 100 rolls—1000 sheets	
Facial, 4½x4½, 2 ply	$8.95/10.37
4½x5, 2 ply	10.25/10.75

Paper Towels—per case of 3750

Wh. Jr. M'tif'd 9½x9½	$6.40
Br. Sr. M'tif'd 9⅞x12	4.40
Br. Jr. M'tif'd 9½x9⅞	3.90
Br. Jr. Sgl. fold 9⅞x10¾	3.95
C-Fold 10¼ min. x 14 max.	5.90/ 6.64
Blchd. 7½x11, 48/50 rolls	6.80/ 7.92

Manila, per cwt.

No. 1 Jute Tag, 100-lb., sheets	$20.55/22.55
Reg. Jute M.F. 40-lb., sheets	19.50/21.50
Printing Manila	12.00/ —

Gummed Tape—per bdl., 500 bdls. or more

90-lb. 375 ft. GSI	$7.20 / —
60-lb. 600 ft. GSI	7.20 / —
35-lb. 800 ft. GSI	8.28 / —
35-lb. 500 ft. GSO	6.21 / —

MARKET WOOD PULP

Third Quarter Contract Prices, Per Short Air-Dry Ton

	Varying freight allowances		On Dock Atlantic Ports		
	*U.S.	Canadian	Swedish	Finnish	Norwegian
Groundwood	$92.50/ — *	$70.00/ 90.00			
Sulfate, Bleached	142.00/150.00	150.00/155.00	$140.00/150.00		
Semi-bleached Sulfate	140.00/ —				
Sulfate, Unbl.	100.00/125.00	100.00/135.00	115.00/120.00		$125.00/ —
Sulfite, Blchd.	140.00/ —	140.00/150.00	140.00/145.00	$140.00/ —	140.00/ —
Sulfite, Unblchd.	125.00/132.50*	140.00/160.00	125.00/135.00	125.00/ —	130.00/ —
Sulfite, Unbl'd (Glassine)					
Soda, Blchd.	140.00/ —	145.00/ —	130.00/ —		
Sulfite Screenings	72.50/ —				
Sulfate Screenings	67.50/ —				
Groundwood Screenings	60.00/ —				
Unblchd Sulfate Sideruns	132.50/ —				
Stand. News. Sideruns	92.50/ —				

* OPS Ceiling, CPR 49 ‡ F.o.b. Shipping Point.

Boards Deld., per ton (10 tons or over) CPR 108

Filled News	‡ $90.00/110.00*
Plain Chip	‡ 90.00/105.00*
Blchd. Mla. L-d. Chip	150.00/ —
White Pat. coated .020	‡ 170.00/175.00*
Kr. Liner 42 lb. M sq. ft. $2.47	117.50/ —
Kr. Corr. .009 M sq. ft. $1.59	122.50/ —
Binders Boards	137.50/140.00

The following prices are representative distributors' resale prices:

Rag Content Bonds and Ledgers— White, 20 lb.

Bonds	4 Ctns.
	per cwt.
100% Rag Ex. No. 1	$70.45/$75.90
100% Rag	62.65/ —
75% Rag	48.15/ —
50% Rag	38.90/ —
25% Rag	31.65/ 33.00

Ledgers	4 Ctns.
	per cwt.
100% Rag Ex. No. 1	$72.65/$72.80
100% Rag	63.90/ —
75% Rag	49.40/ —
50% Rag	40.20/ —
25% Rag	33.00/ 34.30

Sulphite Bonds and Ledgers White, 20 lb.

Bonds	4 Ctns.
	per cwt.
Watermarked	$19.00/$20.50
Plain	18.40/ 19.50

Ledgers	4 Ctns.
	per cwt.
Watermarked	$20.30/$21.80
Plain	19.35/ 20.80

White Book

Conversion Coated	Case
	per cwt
No. 1	$23.90/$24.65
No. 2	22.40/ 22.85
Machine Coated	
Extra No. 1	$21.35/$21.65
No. 1	19.15/ 19.65
No. 2	16.65/ 17.40
Uncoated	
No. 1 Antique (Watermarked)	$19.15/$19.65
Offset	18.15/ 19.15
A Grade E. F.	18.40/ 18.65
A Grade S. C.	18.90/ 19.15
B Grade E. F.	17.40/ 18.15
B Grade S. C.	17.90/ 18.65

‡ Indicates a price change.

WASTE PAPER MARKET

Prices to mills, per ton, f.o.b. cars shipping point (includes brokers' fee.) These quotations are a partial indication of the price range in each market on the date specified, as gathered from major dealers. ALL PRICES ARE STRICTLY NOMINAL.

	New York June 16	Philadelphia June 12	Boston June 12	Chicago June 3
No. 1 Mixed Paper	nominal	nominal	$7.00/ —	$8.00/ —
No. 1 News	$8.00/ 10.00	nominal	9.00/ 12.00	12.00/ —
Over-issue News	18.00/ 19.00	nominal	12.00/ 14.00	15.00/ —
Mill Wrappers	8.00/ 12.00	nominal	13.00/ 19.00	11.00/ —
Corrugated Containers	10.00/ 11.00	nominal	12.50/ 13.00	14.00/ —
Double Kraft Ld. Corr. Cuts	30.00/ 37.50	25.00/ 37.50	25.00/ 40.00	35.00/ 37.50
100% Kraft Corr. Cuts	40.00/ 55.00	40.00/ 55.00	45.00/ 55.00	55.00/ —
Used Sugar & Flour Bags	35.00/ 45.00	25.00/ 35.00	25.00/ 35.00	30.00/ —
Super Resorted Br. Kraft	35.00/ 45.00	25.00/ 40.00	20.00/ 35.00	30.00/ —
New Br. Kraft Env. Cuts	60.00/ 70.00	65.00/ 75.00	55.00/ 65.00	70.00/ —
New Br. Kraft Cuts	60.00/ 65.00	55.00/ 70.00	45.00/ 55.00	60.00/ —
No. 1 Gdwd. Shvs.	20.00/ 30.00	20.00/ 30.00	28.00/ 30.00	22.00/ —
White Newsblanks	50.00/ 65.00	60.00/ 70.00	40.00/ 50.00	45.00/ —
No. 1 Flyleaf Shvs.	45.00/ 50.00	25.00/ 40.00	25.00/ 42.50	30.00/ —
No. 1 Soft Wht. Shvs.	75.00/ 85.00	70.00/ 85.00	75.00/ 85.00	75.00/ —
Super Soft Wht. Shvs.	85.00/ 95.00	85.00/ 95.00	95.00/100.00	85.00/ —
Hd. Wht. Shvs.	87.50/105.00	105.00/115.00	85.00/100.00	90.00/ —
Hd. Wht. Env. Cuts	110.00/125.00	120.00/130.00	105.00/115.00	100.00/ —
New Manila Env. Cuts	60.00/ 70.00	75.00/ 85.00	60.00/ 70.00	40.00/ —
Col. Tab. Cards	35.00/ 42.50	40.00/ 45.00	40.00/ 50.00	35.00/ —
Manila Tab. Cards	60.00/ 65.00	65.00/ 70.00	60.00/ 65.00	60.00/ —
No. 1 Mixed Ledger	35.00/ 37.50	35.00/ 40.00	35.00/ 45.00	35.00/ —
White Ledger	45.00/ 50.00	55.00/ 60.00	50.00/ 55.00	50.00/ —
No. 1 Book & Mag.†	20.00/ 22.00	20.00/ 25.00	20.00/ 25.00	15.00/ —
No. 1 Rep'd. Hvy. Books‡	35.00/ 40.00	35.00/ 40.00	30.00/ 37.50	27.50/ —

† Includes Time & Life; no coarse groundwood. ‡ Not to exceed 10% groundwood. § Deld.

RAG MARKET

New Domestic Cotton Cuttings
OPS Ceiling Price, CPR 28 *
Delivered Mill Basis

No. 1 White Shirts	$16.00/$21.00*
No. 1 Unblchd. Muslins	16.00/ 21.00*
Blchd. & Unblchd. Underwears	17.00/ 21.00*
Blchd. Canton Flannels	15.50/ 21.00*
No. 1 Light Silesias	13.25/ 16.00*
No. 1 Light Prints	8.75/ 11.50*
No. 1 Blue Overalls	11.75/ 14.50*
Suntan Khakis	9.00/ 11.50*
Fancy Shirts	7.75/ 10.00*
Indigo Blues	7.50/ 10.00*
Mixed Khakis	6.00/ 8.00*
Corduroys	7.00/ 8.00*
Cottonades	6.75/ 8.00*
No. 1 Washables	5.25/ 6.50*

Old Domestic Cotton Rags
(Prices to Dealers, f.o.b. Ship. Pt.)

	Per 100 lbs.
Mixed White	$4.00/$4.50
Cotton Pants & Overalls	3.00/ 3.50
Thirds and Blues, Repacked	nominal
No. 1 Roofing Rags	1.00/ 1.10
No. 2 Roofing Rags	.90/ 1.00

Bagging
(Prices to Dealers, f.o.b. N Y)

	Per 100 lbs.
Foreign Gunny	$4.75/$5.25
Heavy Wool Tares	5.00/ 5.25
Foreign Scrap Burlap	3.75/ 4.00
Austr. Wool Pouches	6.00/ 7.00
Domestic Manila Rope	8.00/ 8.75
No. 1 Sisal Strings	7.00/ 7.50

COTTON LINTERS

Memphis Market
F.o.b. Oilmills

		cents per lb.
Grade 2		13.00/ 11.50
3	1st cut	11.25/ 9.50
4		9.00/ 8.25
5		8.00/ 7.75
6	2nd cut	7.50/ 7.00
7		7.00/ 7.00

MATERIAL PRICES

Aluminum sulfate:		
coml. bags, wks.....cwt.	1.65	
iron-free, c.l.	3.25	
Alcohol, ethyl:		
tax free, dms. c.l.....gal.	1.01	/ 1.05½
deld. East Miss.		
Alcohol, methyl:		
Synthetic, Zone 1, dms.		
c.l. fit. alld.....gal.	.44	
Casein, acid prec.:		
dom. sh. pt. c.l. .....lb.	.27	/ .37½
imp. ex. dock .....lb.	.15	/ .21
Caustic soda:		
c.l. wks. solid, 76% cwt.....	3.35	
flak. & grd. 100-lb. drums...	3.75	
liquid 50% tanks....	2.55	
liquid 70% tanks....	2.65	
China clay:		
dom. air-float. c.l. wks. ton	10.00	
water-washed, lump, filler....	11.00	
coating	17.60	/30.50
imported, ex whse...short ton	15.20	/28.35
Chlorine:		
single-unit tanks, works..cwt.	2.70	
multi-unit .....cwt.	3.20	/ 4.40
Formaldehyde:		
USP, inh. dms, c.l. wks....lb.	.0625/	.0675
l.c.l., E. wks.....	.0675/	.0725
Fuel oil:		
Bunker C, No. 6 Cal. hvy.		
tanks, refinery .....bbl.	1.95	/ 2.15
light .....bbl.	2.00	/ 2.25
Hydrogen peroxide:		
USP, 35% cbys. E. of Miss. lb.	.23½/	.26½
Lime:		
hydrated, bags, wks. .....tons	13.50	
Rosin:		
B gum, drms, c.l. Savan..cwt.	7.00	/ 9.08*
K, M, N .....cwt.	7.35	/ 9.49*
FF, wood, do.....cwt.	4.34	/ —
* OPS Ceiling, CPR 52.		
Rosin size:		
70%, gum & pale grds, tank		
cars, south, sh. pt.....cwt.	6.30	/ 6.40
Salt cake:		
dom. bulk, c.l. wks.....ton	17.00	
wks. frt. all.....ton	20.00	/22.00
Soda ash:		
light, 58%, bags, wks.....	1.50	
bulk .....cwt.	1.20	
Sodium silicate, 40°:		
turbid. c.l. wks.....cwt.	1.30	/
l.c.l. wks.	1.60	/ 1.85
Sodium peroxide:		
dms. c.l. E. of Miss.....lb.	.21	
l.c.l. do. .....lb.	.21½/	.22
Soybean, protein:		
chem. isol, wks, c.l., bags..lb.	.25	/ .29
Cinn. and Chic.		
Sulfuric acid:		
60° Be. cbys. c.l. wks.....cwt.	1.75	/ —
l.c.l. wks. .....cwt.	2.05	/ 2.85
Sulfur:		
crude, c.l. mines, contract, long ton	21.00	/22.00
f.o.b. vessels Gulf	22.50	/23.50
Sulfur dioxide:		
liquid, coml. cyl. wks.....lb.	.09	
multi-unit cars .....lb.	.0535	
Starches:		
pearl corn, bags, c.l. wks...cwt.	6.59	/ —
white dextrines, c.l. wks...cwt.	7.97	/ —
potato, Idaho, c.l. wks....cwt.	nominal	
potato, Maine, c.l. wks... cwt.	nominal	
tapioca, conv. dextrines...cwt.	8.50	/ 9.00
Talc:		
domestic, 50-lb. sacks, c.l.		
wks. .....ton	25.00	/30.00
Titanium dioxide:		
anastase, c.l. deld., bags...lb.	.21	/ .21½
l.c.l. deld. .....lb.	.22	/ .22½
rutile, c.l. deld. .....lb.	.23	/ .23½
l.c.l. deld. .....lb.	.24	/ .24½

WHAT'S NEW IN PUBLICATIONS

Now for The First Time Fully Automatic Counting & Banding. (Bulletin). Sales copy with technical details on Berlin & Jones automatic counting and banding machine. Berlin & Jones Co., Inc., 601 W. 26th St., New York 1, N. Y.

Standards of Tubular Exchanger Manufacturers Association. Book, 3rd edition, 162 pp. A single, completely self-contained reference source for designers and users of heat exchangers. Available to nonmembers at the Association's publishing cost of $5.50 postpaid. TEMA, 53 Park Place, New York 7, N. Y.

Industrial Staticator with Dual Automatic Static Warning Signals. (Bulletin). Sales copy with technical details. John Hewson Co., 106 Water St., New York 5, N. Y.

Continuous Wide Chart Recording of Alternating Voltage or Current. Instrumentation Data Sheet #9.1-13. Includes illustrations and dimensional drawings. Minneapolis-Honeywell Regulator Co., Brown Instruments Div., Station 40, Wayne and Windrim Aves., Philadelphia 44, Pa.

Air-Operated Diaphragm Motor Valves. Specification sheet 400-4. Gives sizes, construction, trim materials, temperature construction, temperature pressure drops and complete mounting dimensions. Minneapolis-Honeywell Regulator Co., Brown Instruments Div., Station 40, Wayne and Windrim Aves., Philadelphia 44, Pa.

Burning Facts. (Booklet SC 675). Published in the interest of better record protection by Safe Manufacturers National Association, New York. Features: Protective Equipment; What the Labels Mean; Complete Protection with the Right Insurance. Remington Rand Inc., 315 Fourth Ave., New York 10, N. Y.

Durametallic Handy-Pack Packings. (Bulletin No. 443). Illustrated. Durametallic Corp., 2104 Factory St., Kalamazoo 24F, Mich.

Kates Direct Acting Flow Rate Regulators. (Bulletin 521). Describes in detail the company's line of flow rate regulators. W. A. Kates Co., 430 Waukegan Road, Deerfield, Ill.

Resin Emulsions for Heat Seal and Grease Proof. (Data sheet A-43). Covers ARCCO heat seal emulsions designed primarily for heat bonding various combinations of papers, cloths, leathers, metal foils, plastic films, and other surfaces. American Resinous Chemicals Corp., Peabody, Mass.

Scotch Brand Pressure-Sensitive Tapes (Booklet). Describes the thickness, elongation, tensile strength, and adhesion of paper tapes, rayon reinforced paper filament tape, colored and transparent acetate fibre tapes, colored and transparent rayon reinforced plastic filament tapes, and glass reinforced transparent plastic filament tape. Minnesota Mining and Mfg. Co., 900 Fauquier St., St. Paul 6, Minn.

Index of Literature. (Bulletin 100-A). Index of technical literature from Honeywell's Industrial Division. Consists of both a numerical listing and alphabetical cross index for specification sheets, instrumentation data sheets, catalogs and other literature. Includes articles from "Instrumentation" the manufacturers quarterly publication. Minneapolis-Honeywell Regulator Co., Brown Instruments Div., Wayne and Windrim Aves., Philadelphia 44, Pa.

Clear-View Display. (Catalog). Guide to the complete line of MACO products, (tags, labels, pin tickets and die-cut specialties). J. L. May Co., 111 W. 19th St., New York 11, N. Y.

NEW EQUIPMENT

(Continued from page 46)

Either model can be equipped with a lead tube for sulphuric, hydrochloric,

hydrofluoric and similar acids or with a Saran (flexible plastic) tube for nitric, phosphoric, acetic acids, peroxide and many other liquids.

NAWMD Southern Div. Meeting

A metals meeting and a combined waste paper-rags gathering will highlight the one-day meeting of the newly-revised Southern Division of the National Assn. of Waste Material Dealers, Inc., at the Biltmore Hotel in Atlanta, Ga., on June 26. The day's activities will get underway with a luncheon and the commodity meetings will begin at 2 P.M. A reception and dinner will be held at the Mayfair Club in Atlanta. Entertainment will be featured during the dinner.

Bids and Awards

GPO 3rd Quarter, 1952 Paper Needs

WASHINGTON — Bids were received on June 16 by the Joint Congressional Committee on Printing for paper for the use of the Government Printing Office for a three-month period beginning July 1, 1952. Awards, announced June 23, are indicated by asterisks (*) before the names of the successful bidders in the tabulation herewith.

Newsprint

No. 1—850,000 lbs., 24x36—64; rolls, 19, 24, 36, 38 and 48 ins. wide, diameter, 34 ins. min., 36 ins. max. (3-inch fiber cores); min. order, 40,000 lbs.

Machine-Finish Book

No. 5—1,100,000 lbs., 25x38—70; flat, cut any size, min. width 21 ins., max. width 48 ins.; min. order, 40,000 lbs.

Mead Sales Co. (per pound)	$.1255
Mudge Paper Co. (250,000 only)	.11744
Wilcox, Walter, Furlong Co.	.10917
* Barton Duer & Koch Paper Co.	.1307

No. 6—10,000 lbs., 25x38—70; rolls, 9½ ins. wide; diameter, 34 ins. min., 36 ins. max. (3-inch fiber cores); min. order, 10,000 lbs.

* Mead Sales Co.	1.1215

No. 7—400,000 lbs., 25x38—70; rolls, 19, 28½, and 38 ins. wide, 34 ins. min., 36 ins. max. (3-inch fiber cores); min. order, 40,000 lbs.

Mead Sales Co.	$.1133
Mudge Paper Co.	.10994
* Wilcox, Walter, Furlong Co.	.09917
Barton, Duer & Koch Paper Co.	.1226

No. 8—200,000 lbs., 25x38—70; rolls, 24, 36, and 48 ins. wide; diameter, 34 ins. min., 36 ins. max. (3-inch fiber cores); min. order, 40,000 lbs.

Mead Sales Co.	$.1133
Mudge Paper Co.	.10994
Wilcox, Walter, Furlong Co.	.09917
* Barton, Duer & Koch Paper Co.	.1226

No. 9—80,000 lbs., 25x38—70; rolls, 22, 33, 44 and 46 ins. wide, 38 ins. min. 40 ins. max. (3-inch iron or metal-capped fibre cores); min. order, 10,000 lbs.

Mead Sales Co.	$.1133
* Wilcox, Walter, Furlong Co.	.09917

English-Finish Book

No. 12—175,000 lbs., 25x38—90; flat, cut any size, min. width 24 ins., max. width 48 ins., max. length, 56 ins.; min. order, 20,000 lbs.

Mudge Paper Co. (per pound)	$.1284
* Barton Duer & Koch Paper Co.	.1270
Stanford Paper Sales Corp.	.1310

Machine-Finish Book End Paper

No. 16—20,000 lbs., 25x38—160; flat, cut 38x50 ins.; min. order, 20,000 lbs.

Bermingham Prosser Co.	$.1299
* Wilcox, Walter, Furlong Co.	.1226
Barton, Duer & Koch Paper Co.	.1317

Offset Book

No. 17—100,000 lbs., 25x38—80; flat, cut any size, min. width 24 ins., max. width 48 ins.; the grain to run lengthwise of the sheet; min. order, 40,000 lbs.

Mudge Paper Co.	$.1543
* Howard Paper Mills (Aetna Div.)	.1428

No. 18—4,900,000 lbs., 25x38—100; flat, cut any size, min. width 24 ins., max. width 48 ins.; the grain to run lengthwise of the sheet; min. order, 40,000 lbs.

* Whitaker Paper Co. (2,450,000)	$.1120
* Whitaker Paper Co. (2,450,000)	.1150
Walker, Goulard, Plehn Co. (1,000,000 only)	.1374
Mead Sales Co. (500,000 only)	.1342
Eastern Corp. (1,000,000)	.1299
Eastern Corp. (1,000,000)	.1314
Eastern Corp. (1,000,000)	.1339
Eastern Corp. (1,900,000)	.1352
Mudge Paper Co. (500,000 only)	.1352
Central Ohio Paper Co. (1,000,000)	.1376
Frank Parsons Paper Co. (1,000,000)	.1416
Howard Paper Mills (Aetna Div.) (2,500,000)	.1328

No. 19—40,000 lbs., 25x38—120; flat, cut 8x10½ ins.; the grain to run the 10½ inch way; min. order, 40,000 lbs.

* Whitaker Paper Co.	$.1250
Howard Paper Mills (Aetna Div.)	.1426

No. 20—300,000 lbs., 25x38—120; flat, cut any size, min. width 24 ins., max. width 48 ins.; the grain to run lengthwise of the sheet; min. order, 40,000 lbs.

Mead Sales Co. (per lb.)	$.1342
* Bermingham Prosser Co.	.1297
Mudge Paper Co.	.1352
Central Ohio Paper Co.	.1366
Howard Paper Mills (Aetna Div.)	.1328

Antique Book

No. 24—130,000 lbs., 25x38—90; flat, cut 32x42, and 38x50; min. order, 40,000 lbs.

Whitaker Paper Co.	$.1225
Mead Sales Co.	.1273
Bermingham Prosser Co.	.1195
Mudge Paper Co.	.1199
Wilcox, Walter, Furlong Co.	.1094
* R. P. Andrews Paper Co.	.0965
Stanford Paper Sales Corp.	.1144
Barton, Duer & Koch Paper Co.	.1295

No. 25—55,000 lbs., 25x38—120; flat, cut 32x42, 38x48, and 38x50 ins.; min. order, 20,000 lbs.

Bermingham Prosser Co.	$.1204
Wilcox, Walter, Furlong Co.	.1058
* R. P. Andrews Paper Co.	.0965
Stanford Paper Sales Corp.	.1140
Barton, Duer & Koch Paper Co.	.1295

No. 26—20,000 lbs., 25x38—140; flat, cut 32x42, 38x48, and 38x50 ins.; min. order, 20,000 lbs.

Bermingham Prosser Co.	$.1204
* Wilcox, Walter, Furlong Co.	.1058
Stanford Paper Sales Corp.	.1150
Barton, Duer & Koch Paper Co.	.1295

50% Antique Book

No. 30—80,000 lbs., 25x38—80; flat, cut 27x40¼, 31½x46½, and 38x48 ins.; min. order, 40,000 lbs.

* Walker, Goulard Plehn Co. (per pound)	$.2144
Paper Corp. of U. S.	.2247
Wilcox, Walter, Furlong Co.	.2333
Frank Parsons Paper Co.	.2298
Howard Paper Mills (Aetna Div.)	.2190

No. 31—40,000 lbs., 25x38—80; shall be suitable for writing on with ink; flat, cut 22¾x31 ins.; min. order, 30,000 lbs.

* Walker, Goulard Plehn Co.	$.2144
Paper Corp. of U. S.	.2247
Wilcox, Walter, Furlong Co.	.2333
Frank Parsons Paper Co.	.2300
Howard Paper Mills (Aetna Div.)	.2190

Water Resistant (Text) Book

No. 34—300,000 lbs., 25x38—120; flat, cut 32x42 and 35x45 ins.; min. order, 40,000 lbs.

Walker, Goulard Plehn Co.	$.1933
* Stanford Paper Sales Corp.	.1880

Supercalendered Book

No. 36—260,000 lbs., 25x38—90; flat, cut any size, min. width 24 ins., max. width 48 ins.; min. order, 20,000 lbs.

* Walker, Goulard Plehn Co.	$.1187
Mead Sales Co.	.1254

No. 37—400,000 lbs., 25x38—90; rolls, 19, 28½ and 38 ins. wide, 34 ins. min., 36 ins. max. (3-inch fiber cores); min. order, 40,000 lbs.

* Walker, Goulard Plehn Co.	$.1099
Mead Sales Co.	.1133
Mudge Paper Co.	.1132

Coated Book

No. 39—1,600,000 lbs., 25x38—100; flat, cut any size, min. width 24 ins., max. width 48 ins.; min. order, 40,000 lbs.

* Walker, Goulard Plehn Co.	$.1179
Mead Sales Co. (600,000 only)	.1199
R. P. Andrews Paper Co.	.1207
Frank Parsons Paper Co.	.1210
Stanford Paper Sales Corp. (800,000 only)	.1184
Barton, Duer & Koch Paper Co.	.1183

No. 40—125,000 lbs., 25x38—120; flat, cut any size, min. width 24 ins., max. width 48 ins.; min. order, 40,000 lbs.

Walker, Goulard Plehn Co.	$.1269
Mead Sales Co.	.1199
R. P. Andrews Paper Co.	.1207
Frank Parsons Paper Co.	.1210
* Stanford Paper Sales Corp.	.1184
Barton, Duer & Koch Paper Co.	.1183

No. 41—100,000 lbs., 25x38—100; rolls, 28½ and 38 ins. wide; diameter, 34 ins. min., 36 ins. max. (3-inch fiber cores); min. order, 40,000 lbs.

Walker, Goulard Plehn Co.	$.1044
Mead Sales Co.	.1045
Frank Parsons Paper Co.	.1055
* Stanford Paper Sales Corp.	.1034
Barton, Duer & Koch Paper Co.	.1034

No. 43—100,000 lbs., 25x38—140; flat, cut 32x42, 38x48, 39x50, and 42x64 ins.; the grain to run lengthwise of the sheet; min. order, 40,000 lbs.

* Walker, Goulard Plehn Co.	$.1497
Mudge Paper Co.	.1681
Stanford Paper Sales Corp.	.1620

Goldenrod Coated Book

No. 42—7,000 lbs., 25x38—160; flat, cut 38x50 and 42x58 ins.; min. order, 2,000 lbs.

Whitaker Paper Co.	$.2019
* Bermingham Prosser Co.	.1985
Mudge Paper Co.	.2018

Litho Coated Book

No. 46—190,000 lbs., 25x38—140; flat, cut 32x42, 35x45, 38x48, 39x50, and 41x52 ins.; the grain to run lengthwise of the sheet; min. order, 20,000 lbs.

Whitaker Paper Co.	$.1609
* Walker, Goulard Plehn Co.	.1497
Mudge Paper Co.	.16317
Stanford Paper Sales Corp.	.1695
Frank Parsons Paper Co.	.1591

Chemical Wood Mimeographed White and Colored

No. 50—600,000 lbs., white, No. 40; flat, cut 28½x34½, 32½x42½, 38x48½. Grain size 28½x34½ ins. to run the 28½ inch way; size 32½x42½ ins. to run the 42½ inch way; size 38x48½ ins. to run the 38 inch way; min. order, 40,000 lbs.

Whitaker Paper Co.	$.1159
Walker, Goulard Plehn Co.	.1247
Mudge Paper Co. (300,000 only)	.1186
Mead Sales Co.	.1324
Wilcox, Walter, Furlong Co.	.1255
R. P. Andrews Paper Co. (300,000 only)	.1124
Frank Parsons Paper Co.	.1204
Stanford Paper Sales Corp.	.1124
* Barton, Duer & Koch Paper Co.	.1122

No. 51—400,000 lbs., No. 40; flat, cut 8x10½ ins.; grain 10½ inch way; min. order, 40,000 lbs.

Whitaker Paper Co.	$.1259
Walker, Goulard Plehn Co.	.1317
Mead Sales Co.	.1471
Cauthorne Paper Co.	.1271
Boston Paper Board Co.	.1378
Wilcox, Walter, Furlong Co.	.1330
* R. P. Andrews Paper Co.	.1209
Stanford Paper Sales Corp.	.1249
Barton, Duer & Koch Paper Co.	.1297

No. 52—90,000 lbs., blue, buff, green, pink and yellow, No. 40; flat, cut 32½x42½, and 38x48½ ins. Grain: size 32½x42½ ins. to run the 42½ inch way; size 38x48½ ins. to run the 38 inch way. Min. order, one color, 10,000 lbs.

Mead Sales Co.	$.1422
* Bermingham Prosser Co.	.1210

25% Mimeograph

No. 53—100,000 lbs., No. 40; flat, cut 28½x34½, 32½x42½, 38x48½, and 40½x42½ ins. Grain: size 28½x34½ ins. to run the 28½ inch way; size 32½x42½ ins. and 40½x42½ ins. to run the 42½ inch way; size 38x42½ ins. to run the 38-inch way; min. order, 20,000 lbs.

Walker, Goulard Plehn Co.	$.1538
R. P. Andrews Paper Co.	.1574
Frank Parsons Paper Co.	.1777
* Howard Paper Mills (Aetna Div.)	.1528
Howard Paper Mills (Aetna Div.)	.1528

No. 54—100,000 lbs., No. 40; flat, cut 8x10½ ins.; grain 10½ inch way; min. order, 40,000 lbs.

Walker, Goulard Plehn Co.	$.1597
Boston Paper Board Co.	.2333
R. P. Andrews Paper Co.	.1671
Frank Parsons Paper Co.	.1844
Stanford Paper Sales Corp.	.16786
* Howard Paper Mills (Aetna Div.)	.1583

Duplicator Copy Paper Liquid Process, White and Colored

No. 57—140,000 lbs., white; No. 40; flat, cut 32x42, 34x44 and 40x52½ ins.; the grain to run lengthwise of the sheet; min. order, 40,000 lbs.

* Walker, Goulard Plehn Co.	$.1311
Eastern Corp.	.1510
Mudge Paper Co.	.1381
Stanford Paper Sales Corp.	.1582

No. 59—90,000 lbs., pink, yellow, green and blue, No. 40; flat, cut 32x42, 34x44 and 40x52½ ins.; the grain to run lengthwise of the sheet; min. order, 10,000 lbs.

* Walker, Goulard Plehn Co.	$.1469
Stanford Paper Sales Corp.	.1715

Chemical Wood Writing White and Colored

No. 61—200,000 lbs., white, No. 26; flat, cut any size, min. width 21 ins.; max. width 48 ins.; min. order, 40,000 lbs.

Walker, Goulard Plehn Co.	$.1457
Mudge Paper Co. (100,000 only)	.1535
Frank Parsons Paper Co.	.1516
* Bulkley, Dunton & Corp.	.1390
Barton, Duer & Koch Paper Co.	.1502

No. 62—3,000,000 lbs., white, No. 32; flat, cut any size, min. width 21 ins., max. width 48 ins.; min. order, 40,000 lbs.

* Whitaker Paper Co. (1,000,000)	$.1081
Walker, Goulard Plehn Co.	.1158
	.1177
	.1208

Mead Sales Co. (800,000 only).. .1383
Eastern Corp. ..... .1420
* R. P. Andrews Paper Co..... .1073
(2,000,000 only)
Frank Parsons Paper Co. ..... .1406
(1,500,000 only)
Bulkley, Dunton & Corp..... .1160
(750 tons only)
Barton, Duer & Koch Paper Co... .1272
(500 tons only)
Marathon Corp. ..... .1315

No. 64—3,100,000 lbs., No. 40; flat, cut any size, min. width 21 ins., max. width 48 ins.; min. order, 40,000 lbs.
* Whitaker Paper Co..... $.1040
(1,000,000 only)
* Whitaker Paper Co..... .1065
(100,000 only)
Walker, Goulard Plehn Co..... .1145
(One-third)
Walker, Goulard Plehn Co..... .1167
(One-third)
Walker, Goulard Plehn Co..... .1202
(One-third)
Mead Sales Co. (900,000 only)... .1324
* R. P. Andrews Paper Co..... .1043
R. P. Andrews Paper Co..... .1043
(2,000,000 only)
Frank Parsons Paper Co..... .1346
(1,500,000 only)
Bulkley Dunton & Corp..... .1135
(750 tons only)
Barton, Duer & Koch Paper Co... .1247
(500 tons only)
Marathon Corp. ..... .1255

No. 65—120,000 lbs., white, No. 40; flat, cut 8x10½ ins.; min. order, 40,000 lbs.
* R. P. Andrews Paper Co..... $.1169
Bulkley, Dunton Corp..... .1235

No. 66—425,000 lbs., white, No. 32; rolls, min. width 16 ins., max. width 48 ins., diameter 34 ins. min., 36 ins. max. (3-inch fiber cores); min. order, 20,000 lbs.
Walker, Goulard Plehn Co..... $.1006
Mead Sales Co..... .1260
* R. P. Andrews Paper Co..... .0994
Stanford Paper Sales Corp..... .1285
Barton, Duer & Koch Paper Co... .1167
Marathon Corp. ..... .1170

No. 68—335,000 lbs., white, No. 40; rolls, min. width 16 ins., max. width 48 ins., diameter 34 ins. min., 36 ins. max. (3-inch fiber cores); min. order, 20,000 lbs.
* Whitaker Paper Co..... $.0930
Walker, Goulard Plehn Co..... .0981
Mead Sales Co..... .1200
R. P. Andrews Paper Co..... .0934
Stanford Paper Sales Corp..... .1225
Barton, Duer & Koch Paper Co... .1142
Marathon Corp. ..... .1110

No. 69—100,000 lbs., No. 40; rolls, min. width 21 ins., max. width 46 ins., diameter, 38 ins. min., 40 ins. max. (returnable 3-inch iron or metal-capped fiber cores); min. order, 20,000 lbs.
* Whitaker Paper Co..... $.0930
Walker, Goulard Plehn Co..... .0981
Mead Sales Co..... .1200
R. P. Andrews Paper Co..... .0934
Stanford Paper Sales Corp..... .1225

No. 70—100,000 lbs., blue, buff, green, pink, salmon and yellow, No. 26; flat, cut any size, min. width 21 ins., max. width 48 ins.; min. order, one color, 10,000 lbs.
* Walker, Goulard Plehn Co..... $.01557
Frank Parsons Paper Co..... .1617

No. 71—550,000 lbs., blue, buff, green, pink, salmon and yellow, No. 32; flat, cut any size, min. width 21 ins., max. width 48 ins.; min. order, one color, 10,000 lbs.
Whitaker Paper Co..... $.1389
Walker, Goulard Plehn Co..... .1304
Paper Corp. of U. S..... .1480
Mead Sales Co..... .1482
Bermingham Prosser Co..... .1260
* Bulkley, Dunton Corp..... .1235

No. 72—500,000 lbs., blue, buff, green, pink, salmon and yellow, No. 40; flat, cut any size, min. width 21 ins., max. width 48 ins.; min. order, one color, 10,000 lbs.
Whitaker Paper Co..... $.1329
Walker, Goulard Plehn Co..... .1274
Paper Corp. of U. S..... .1420
Mead Sales Co..... .1422
* Bermingham Prosser Co..... .1210
Bulkley, Dunton Corp..... .1210

No. 73—40,000 lbs., yellow, No. 32; rolls, 32 and 38 ins. wide, 34 ins. min., 36 ins. max. (3-inch fiber cores); min. order, 20,000 lbs.
Whitaker Paper Co..... $.1254
Walker, Goulard Plehn Co..... .1209
Mead Sales Co..... .1359
* Bermingham Prosser Co..... .1155

No. 74—100,900 lbs., white, No. 32; rolls, 36 ins. wide; diameter, 34 ins. min., 36 ins. max. (3-inch fiber cores); min. order, 40,000 lbs.
* Walker, Goulard Plehn Co..... $.1283
(White 36")

No. 74—40,000 lbs., yellow, No. 32; rolls, 38 ins. wide; diameter, 34 ins. min., 36 ins. max. (3-inch fiber cores); min. order, 20,000 lbs.
* Walker, Goulard Plehn Co..... $.1363
(Yellow 38")

No. 76—20,000 lbs., white, No. 30; rolls, 22 ins. wide, diameter 34 ins. min., 36 ins. max. (3-inch fiber cores); min. order, 20,000 lbs.
Walker, Goulard Plehn Co..... $.1398
* Mead Sales Co..... .1298
Stanford Paper Sales Corp..... .1310

No. 77—30,000 lbs., blue, green, pink, yellow, buff, cherry and salmon, No. 24; rolls, 22 ins. wide, diameter 34 ins. min., 36 ins. max. (3-inch fiber cores); min. order, one color, 10,000 lbs.
* Mead Sales Co..... $.1501

50% Lithographed-Finish Map

No. 83—35,000 lbs., No. 32; flat, cut any size, min. width 22 ins., max. width 48 ins.; the grain to run lengthwise of the sheet; min. order, 10,000 lbs.
Paper Corp. of U. S..... $.2494
Stanford Paper Sales Corp..... .2503
Howard Paper Mills (Aetna Div.) .2548
* Barton, Duer & Koch Paper Co... .2468

No. 84—40,000 lbs., No. 40; flat, cut any size, min. width 22 ins., max. width 48 ins.; the grain to run lengthwise of the sheet; min. order, 10,000 lbs.
Paper Corp. of U. S..... $.2466
* Stanford Paper Sales Corp..... .2423
Howard Paper Mills (Aetna Div.) .2498
Barton, Duer & Koch Paper Co... .2468

No. 86—23,000 lbs., No. 56; flat, cut any size, min. width 22 ins., max. width 48 ins.; the grain to run lengthwise of the sheet; min. order, 10,000 lbs.
Paper Corp. of U. S..... $.2466
R. P. Andrews Paper Co..... .2689
* Stanford Paper Sales Corp..... .2383
Howard Paper Mills (Aetna Div.) .2498
Barton, Duer & Koch Paper Co... .2468

High Wet Strength Map

No. 88—673,000 lbs., No. 48; flat, cut any size, min. width 22 ins., max. width 48 ins.; the grain to run lengthwise of the sheet, unless otherwise specified (omit ream markers); min. order, 10,000 lbs.
* Walker, Goulard Plehn Co..... $.1744
Paper Corp. of U. S..... .1780
Cauthorne Paper Co..... .1797
Stanford Paper Sales Corp..... .1883
Howard Paper Mills (Aetna Div.) .1868
Barton, Duer & Koch Paper Co... .1830
Marathon Corp. ..... .19405

50% White Chart, Lithograph-Finish

No. 89—106,000 lbs., No. 72; flat, cut any size, min. width 22 ins., max. width 46 ins.; the grain to run lengthwise of the sheet unless otherwise specified (omit ream markers); min. order, 10,000 lbs.
* Walker, Goulard Plehn Co..... $.2287
Paper Corp. of U. S..... .2601
R. P. Andrews Paper Co..... .2869
Stanford Paper Sales Corp..... .2434
Barton, Duer & Koch Paper Co... .2388

Chemical Wood Manifold White and Colored

No. 97—100,000 lbs., No. 18; flat, cut 21x32, 28x34, 32x42, and 34x44 ins.; min. order, 10,000 lbs.
Walker, Goulard Plehn Co..... $.1647
Paper Corp. of U. S..... .1625
Marquette Paper Co..... .1742
Ecusta Paper Corp..... .2275
Frank Parsons Paper Co..... .1716
Stanford Paper Sales Corp..... .1920
* Bulkley Dunton Corp..... .1520

No. 98—80,000 lbs., white, No. 18; flat, cut 8x10½; min. order, 10,000 lbs.
Whitaker Paper Co..... $.2145
Walker, Goulard Plehn Co..... .1747
Paper Corp. of U. S..... .1750
Marquette Paper Co..... .1897
Ecusta Paper Corp..... .2425
Frank Parsons Paper Co..... .1813
Stanford Paper Sales Co..... .2118
* Bulkley, Dunton Corp..... .1595

No. 99—20,000 lbs., No. 18; rolls, 22 ins. wide, 30 ins. in diameter (3-inch fiber cores); min. order, 20,000 lbs.
Walker, Goulard Plehn Co..... $.1577
(Only if awarded Lot 97)
Paper Corp. of U. S..... .1500
(Only if awarded Lot 97)
Marquette Paper Co..... .1547
Ecusta Paper Corp..... .2025
Frank Parsons Paper Co..... .1509
Stanford Paper Sales Corp..... .1520
* Bulkley, Dunton Corp..... .1275

No. 100—80,000 lbs., blue, buff, cherry, green, pink, salmon and yellow, No. 18; flat, cut 28x34, 32x42, and 34x44 ins.; min. order, one color, 5,000 lbs.
* Walker, Goulard Plehn Co..... $.1747
Marquette Paper Co..... .1842
Frank Parsons Paper Co..... .1820

50% Manifold, White and Colored

No. 101—25,000 lbs., No. 14; flat, cut 32x42 ins.; min. order, 10,000 lbs.
Paper Corp. of U. S..... $.4669
Ecusta Paper Corp..... .4070
* Ancram Paper Co..... .3725
Wilcox, Walter, Furlong Co..... .4735
R. P. Andrews Paper Co..... .5679
Barton, Duer & Koch Paper Co... .4295

No. 102—55,000 lbs., white, No. 18; flat, cut 21x32, 28x34, 32x42, and 34x44 ins.; min. order, 10,000 lbs.
* Walker, Goulard Plehn Co..... $.2888
Paper Corp. of U. S..... .3411
Ecusta Paper Corp..... .3400
Ancram Paper Co..... .3150
R. P. Andrews Paper Co..... .4417
Stanford Paper Co..... .3330
Barton, Duer & Koch Paper Co... .3145

No. 103—10,000 lbs., No. 18; flat, cut 8x10½ ins.; min. order, 10,000 lbs.
* Walker, Goulard Plehn Co..... $.2947
Paper Corp. of U. S..... .3641
Old Dominion Paper Co..... .419999
Ecusta Paper Corp..... .3500
Ancram Paper Co..... .3250
R. P. Andrews Paper Co..... .4667
Stanford Paper Sales Corp..... .3430
Barton, Duer & Koch Paper Co... .3400

No. 104—35,000 lbs., blue, buff, cherry, green, pink, salmon and yellow, No. 18; flat, cut 28x34, 32x42, and 34x44 ins.; min. order, one color, 5,000 lbs.
Paper Corp. of U. S..... $.4181
Old Dominion Paper Co..... .392959
Wilcox, Walter, Furlong Co..... .4234
R. P. Andrews Paper Co..... .4528
Stanford Paper Sales Corp..... .3630
* Barton, Duer & Koch Paper Co... .3195

100% White Manifold

No. 105—5,000 lbs., No. 18; flat, cut 32x42 ins.; min. order, 5,000 lbs.
Paper Corp. of U. S..... $.5858
Wilcox, Walter, Furlong Co..... .5340
R. P. Andrews Paper Co..... .6000
* Stanford Paper Sales Corp..... .5200

50% White Glazed Manifold

No. 106—20,000 lbs., No. 16; flat, cut 32x42 ins.; min. order, 20,000 lbs.
Barton, Duer & Koch Paper Co... $.3890
* Paper Corp. of U. S..... .3830

Chemical Wood Bond, White

No. 112—350,000 lbs., white, No. 40; flat, cut any size, min. width 21 ins., max. width 48 ins.; min. order, 40,000 lbs.
Whitaker Paper Co..... $.1407
Walker, Goulard Plehn Co..... .1358
Eastern Corp. ..... .1410
Cauthorne Paper Co..... .1329
R. P. Andrews Paper Co..... .1450
Howard Paper Mills (Aetna Div.) .1327
* Marathon Corp. ..... .1255

Chemical Wood White Mimeograph Bond

No. 113—110,000 lbs., No. 40; flat, cut 32½x42½ ins.; the grain to run lengthwise of the sheet; min. order, 20,000 lbs.
Walker, Goulard Plehn Co..... $.1354
R. P. Andrews Paper Co..... .1420
* Howard Paper Mills (Aetna Div.) .1327

25% Bond, White and Colored

No. 114—120,000 lbs., No. 26; flat, cut any size, min. width 21 ins., max. width 48 ins.; min. order, 10,000 lbs.
Walker, Goulard Plehn Co..... $.2264
(All or none)
* Paper Corp. of U. S..... .2133
Mudge Paper Co..... .2437
Stanford Paper Sales Corp..... .2253
Howard Paper Mills (Aetna Div.) .2298
Barton, Duer & Koch Paper Co... .2190

No. 115—20,000 lbs., No. 26; rolls, 22 ins. wide; diameter, 34 ins., min. 36 ins. max. (3-inch fiber cores); min. order, 20,000 lbs.
* Paper Corp. of U. S..... $.2083
Stanford Paper Sales Corp..... .2203
Barton, Duer & Koch Paper Co... .2190

No. 116—655,000 lbs., No. 32; flat, cut any size, min. width 21 ins, max. width 48 ins.; min. order, 20,000 lbs.
* Walker, Goulard Plehn Co..... $.1812
(300,000)
Walker, Goulard Plehn Co..... .1827
(Balance)
* Paper Corp. of U. S. (328,000).. .1793
* Paper Corp. of U. S. (27,000).. .1821
Bermingham Prosser Co. (200,000) .1959
Bermingham Prosser Co. (200,000) .1978
Bermingham Prosser Co. (200,000) .2008
Wilcox, Walter, Furlong Co..... .2070
(200,000 only)
Frank Parsons Paper Co..... .1911
(250,000 only)
Stanford Paper Sales Corp..... .1833
Howard Paper Mills (Aetna Div.) .1868
(355,000)
Howard Paper Mills (Aetna Div.) .1898
(Balance)

No. 117—20,000 lbs., No. 32; flat, cut 2x10½ ins.; min. order, 20,000 lbs.
Paper Corp. of U. S..... $.2021
Bermingham Prosser Co..... .2153
* Stanford Paper Sales Corp..... .1953
Howard Paper Mills (Aetna Div.) .2098

No. 118—755,000 lbs., No. 40; flat, cut any size, min. width 21 ins., max. width 48 ins.; min. order, 20,000 lbs.
* Walker, Goulard Plehn Co. (377,000) ..... $.1748
* Paper Corp. of U. S. (378,000)... .1730
Paper Corp. of U. S. (Balance).. .1760
Wilcox, Walter, Furlong Co..... .1821
Frank Parsons Paper Co..... .1848
(250,000 only)
Stanford Paper Sales Corp..... .1861
(250,000 only)

Howard Paper Mills (Aetna Div.) (400,000) .1758
Howard Paper Mills (Aetna Div.) (Balance) .1788

No. 119—20,000 lbs., No. 40; flat, cut any size, min. width 21 ins., max. width 48 ins.; min. order, 20,000 lbs.
* Walker, Goulard Plehn Co. $.1873
Paper Corp. of U. S. .1960
Boston Paper Board Co. .2333
Howard Paper Mills (Aetna Div.) .1988

No. 120—20,000 lbs., No. 32; rolls, 21, 22, and 26 ins. wide; diameter 34 ins. min., 36 ins. max. (3-inch fiber cores); min. order, 20,000 lbs.
* Paper Corp. of U. S. $.1743
Stanford Paper Sales Corp. .1783
Barton, Duer & Koch Paper Co. .1970

No. 122—70,000 lbs., medical form pink, green, yellow, cherry, No. 32; rolls, 26 ins. wide; diameter 34 ins. min., 36 ins. max. (3-inch fiber cores); min. order, 10,000 lbs.
* Paper Sales Corp. of U. S. $.1832
Paper Corp. of U. S. $.1843

No. 123—10,000 lbs., blue, buff, cherry, green, pink, salmon and yellow, No. 26; flat, cut 34x44 ins.; min. order, 5,000 lbs.
Paper Corp. of U. S. $.2650
Howard Paper Mills (Aetna Div.) .2388
* Barton, Duer & Koch Paper Co. .2300

No. 124—265,000 lbs., blue, buff, cherry, green, pink, salmon and yellow, No. 32; flat, cut any size, min. width 21 ins., max. width 48 ins.; min. order, one color, 10,000 lbs.
* Paper Corp. of U. S. (1330,00) $.1873
* Paper Corp. of U. S. (132,000) .1891
Bermingham Prosser Co. (200,000) .1998
Bermingham Prosser Co. (65,000) .2016
Stanford Paper Sales Corp. .1913
Howard Paper Mills (Aetna Div.) .1918

No. 125—95,000 lbs., blue, buff, cherry, green, pink, salmon and yellow, No. 40; flat, cut any size, min. width 21 ins., max. width 48 ins.; min. order, one color, 10,000 lbs.
* Paper Corp. of U. S. (48,000) $.1810
Paper Corp. of U. S. (Balance) .1840
(Only if awarded Lot 124)
* Stanford Paper Sales Corp. (47,000) .1833
Howard Paper Mills (Aetna Div.) .1838

25% Opacified Bond Paper

No. 128—40,000 lbs., No. 32; flat, cut 32x42, 38x48, and 38x49½ ins.; min. order, 40,000 lbs.
* Paper Corp. of U. S. $.1921
Mudge Paper Co. .2178
Howard Paper Mills (Aetna Div.) .2248
Barton, Duer & Koch Paper Co. .2140

50% White Bond

No. 131—20,000 lbs., white, No. 40; flat, cut any size, min. width 21 ins., max. width 34 ins.; min. order, 10,000 lbs.
Paper Corp. of U. S. $.2610
R. P. Andrews Paper Co. .2788
* Stanford Paper Sales Corp. .2280
Howard Paper Mills (Aetna Div.) .2498
Barton, Duer & Koch Paper Co. .2445

100% White Bond

No. 134—21,000 lbs., No. 40; flat, cut any size, min. width 16 ins., max. width 38 ins.; min. order, 2,000 lbs.
Paper Corp. of U. S. $.4501
Wilcox, Walter, Furlong Co. .4445
R. P. Andrews Paper Co. .4772
* Stanford Paper Sales Corp. .4440
* Barton, Duer & Koch Paper Co. .4190

Chemical Wood White Ledger

No. 150—150,000 lbs., No. 48; flat, cut any size, min. width 17 ins., max. width 48 ins.; min. order, 20,000 lbs.
Whitaker Paper Co. $.1389
Walker, Goulard Plehn Co. .1304
Cauthorne Paper Co. .1329
* Wilcox, Walter, Furlong Co. .1247
Frank Parsons Paper Co. .1431
Howard Paper Mills (Aetna Div.) .1425

No. 151—45,000 lbs., No. 64; flat, cut any size, min. width 17 ins., max. width 48 ins.; min. order, 10,000 lbs.
Walker, Goulard Plehn Co. $.1304
* Wilcox, Walter, Furlong Co. .1247
Howard Paper Mills (Aetna Div.) .1425

No. 152—10,000 lbs., No. 64, buff, flat, cut 32x42 ins.; min. order, 10,000 lbs.
* Walker, Goulard Plehn Co. $.1392
Wilcox, Walter, Furlong Co. .1466
Howard Paper Mills (Aetna Div.) .1523

No. 153—30,000 lbs., No. 88; flat, cut any size, min. width 17 ins., max. width 48 ins.; min. order, 10,000 lbs.
Walker, Goulard Plehn Co. $.1304
* Wilcox, Walter, Furlong Co. .1247
Howard Paper Mills (Aetna Div.) .1425

25% Ledger, Whtie and Colored

No. 154—125,000 lbs., white, No. 48; flat, cut 28x34, 32x42, 34x44, and 38x48 ins.; min. order, 10,000 lbs.
Walker, Goulard Plehn Co. $.1779
* Paper Corp. of U. S. .1761
Frank Parsons Paper Co. .1817
Stanford Paper Sales Corp. .1931
Howard Paper Mills (Aetna Div.) .1878

No. 155—115,000 lbs., white, No. 64; flat, cut 28x34, 32x42, 34x44, and 38x48 ins.; min. order, 10,000 lbs.
Walker, Goulard Plehn Co. $.1779
* Paper Corp. of U. S. .1751
Frank Parsons Paper Co. .1787
Stanford Paper Sales Corp. .1911
Howard Paper Mills (Aetna Div.) .1878

No. 156—30,000 lbs., No. 88; flat, cut 28x34, 32x42, 34x44 and 38x48 ins.; min. order, 10,000 lbs.
Walker, Goulard Plehn Co. $.1824
* Paper Corp. of U. S. .1751
Stanford Paper Sales Corp. .1911
Howard Paper Mills (Aetna Div.) .2018

No. 157—35,000 lbs., blue, buff, cherry, green, pink, salmon and yellow, No. 64; flat, cut 34x44 ins.; min. order, one color, 10,000 lbs.
Walker, Goulard Plehn Co. $.1864
* Paper Corp. of U. S. .1861
Frank Parsons Paper Co. .1891
Stanford Paper Sales Corp. .2011
Howard Paper Mills (Aetna Div.) .2038
Barton, Duer & Koch Paper Co. .1945

No. 158—20,000 lbs., blue, buff, cherry, green, pink, salmon and yellow, No. 88; flat, cut 34x44 ins.; min. order, one color, 10,000 lbs.
Walker, Goulard Plehn Co. $.1904
* Paper Corp. of U. S. .1861
Stanford Paper Sales Corp. .2011
Howard Paper Mills (Aetna Div.) .2088
Barton, Duer & Koch Paper Co. .1995

100% White Ledger

No. 176—10,000 lbs., No. 48; flat, cut 28x34, 32x42, and 34x44 ins.; min. order, 4,000 lbs.
* Walker, Goulard Plehn Co. $.3793
Paper Corp. of U. S. .5000
R. P. Andrews Paper Co. .4614
Wilcox, Walter, Furlong Co. .4415
Stanford Paper Sales Corp. .4400
Barton, Duer & Koch Paper Co. .4190

No. 177—15,000 lbs., No. 64; flat, cut 28x34, 32x42, and 34x44 ins.; min. order, 10,000 lbs.
* Walker, Goulard Plehn Co. $.3693
Paper Corp. of U. S. .5000
R. P. Andrews Paper Co. .4614
Stanford Paper Sales Corp. .4300
Barton, Duer & Koch Paper Co. .4190
Wilcox, Walter, Furlong Co. .4315

Chemical Wood, White and Colored Index

No. 182—355,000 lbs., white, 25½x30½—220; flat, cut 32x42 and 34x44, and 39x50 ins., with projecting colored-paper marker between each 100 sheets; min. order, 10,000 lbs.
Whitaker Paper Co. $.1265
Walker, Goulard Plehn Co. .1271
R. P. Andrews Paper Co. .1308
Frank Parsons Paper Co. .11875
Barton, Duer & Koch Paper Co. .1325
* Wilcox, Walter, Furlong Co. .1174

No. 183—25,000 lbs., single-ply, 25½x30½—280; flat, cut 34x44 ins., with projecting colored-paper marker between each 100 sheets; min. order, 10,000 lbs.
Whitaker Paper Co. $.1265
Walker, Goulard Plehn Co. .1274
Mudge Paper Co. .1360
R. P. Andrews Paper Co. .1414
* Wilcox, Walter, Furlong Co. .1174
Barton, Duer & Koch Paper Co. .1325

No. 184—10,000 lbs., single-ply, 25½x30½—340; flat, cut 34x44 ins. with projecting colored-paper marker between each 100 sheets; min. order, 10,000 lbs.
Walker, Goulard Plehn Co. $.1399
R. P. Andrews Paper Co. .1414
* Wilcox, Walter, Furlong Co. .1174
Barton, Duer & Koch Paper Co. .1325

50% Index, White and Colored

No. 188—240,000 lbs., white, 25½x30½—220; flat, cut 32x42, 32x48 and 34x44 ins., with projecting colored-paper marker between each 100 sheets; min. order, 10,000 lbs.
* Walker, Goulard Plehn Co. $.1967
Paper Corp. of U. S. .2149
Cauthorne Paper Co. (80,000 only) .2402
Wilcox, Walter, Furlong Co. .2015
Frank Parsons Paper Co. .2100
Howard Paper Mills (Aetna Div.) .2018
Barton, Duer & Koch Paper Co. .1983

No. 191—165,000 lbs., blue, buff, cherry, fawn, green, pink, salmon and yellow; 25½x30½—220; flat, cut 32x42 and 34x44 ins., with projecting colored-paper marker between each 100 sheets; min. order, one color, 10,000 lbs.
* Walker, Goulard Plehn Co. $.2047
Paper Corp. of U. S. .2240
Frank Parsons Paper Co. .2150
Howard Paper Mills (Aetna Div.) .2118
Barton, Duer & Koch Paper Co. .2100

No. 192—10,000 lbs., blue, buff, cherry, fawn, green, pink, salmon and yellow; 25½x30½—280; flat, cut 34x44 ins., with projecting colored-paper marker between each 100 sheets; min. order, one color, 10,000 lbs.
Walker, Goulard Plehn Co. $.2153
Paper Corp. of U. S. .2270
Frank Parsons Paper Co. .2150
* Barton, Duer & Koch Paper Co. .2130

100% White Index

No. 196—40,000 lbs., 25½x30½—250; flat, cut 20¼x30 ins.; min. order, 20,000 lbs.
* Walker, Goulard Plehn Co. $.3743
Paper Corp. of U. S. .4315
Wilcox, Walter, Furlong Co. .4285
R. P. Andrews Paper Co. .4609
Stanford Paper Sales Corp. .4090
Barton, Duer & Koch Paper Co. .3980

Coated Cover, White and Colored

No. 200—50,000 lbs., white, 20x26—120; flat, cut 26½x41 and 34x44 ins.; the grain to run lengthwise of the sheet; min. order, 10,000 lbs.
Whitaker Paper Co. $.1595
Paper Corp. of U. S. .1490
* Bermingham Prosser Co. .1460
Mudge Paper Co. .1630

Antique-Finish Cover, White and Colored

No. 202—70,000 lbs., 20x26—100; flat, cut 25¼x39 and 34x44 ins.; min. order, 20,000 lbs.
Whitaker Paper Co. $.1369
Walker, Goulard Plehn Co. .1294
Old Dominion Paper Co. .135669
Marquette Paper Co. .1365
* Wilcox, Walter, Furlong Co. .1173
R. P. Andrews Paper Co. .1500
Frank Parsons Paper Co. .1359

No. 203—105,000 lbs., 20x26—100; blue, buff, dawn, quaker drab, terra cotta, gray, brown, green, gobelin blue, granite, tea, and canary; flat, cut 25¼x39 and 34x44 ins.; min. order, one color, 10,000 lbs.
* Whitaker Paper Co. $.1375
Old Dominion Paper Co. .150748
Marquette Paper Co. .1565
R. P. Andrews Paper Co. .1575
Frank Parsons Paper Co. .1499

Cloth Lined Cover, White and Colored

No. 205—5,000 sheets, white, 20x26—72; flat, cut 28x40½ ins.; min. order, one color, 5,000 sheets.
* Barton, Duer & Koch Paper Co. $350.00
(per 1,000 sheets)

50% Laid Cover, Colored

No. 206—47,000 lbs., blue, cream, white, gray, and green; 20x26—130; flat, cut 25¼x39 and 34x44 ins.; the laid lines to run the short direction of the sheet; min. order, one color, 2,000 lbs.
* Paper Corp. of U. S. $.2190
Mudge Paper Co. .2549
Frank Parsons Paper Co. .2350

Wood Manila

No. 208—120,000 lbs., 24x36—80; flat, cut 25x38, 32x42, and 40x52½ ins.; min. order, 20,000 lbs.
Whitaker Paper Co. $.1024
Boston Paper Board Co. .1068
Frank Parsons Paper Co. .1020
Stanford Paper Sales Corp. .1050
* Bulkley, Dunton Corp. .0895
Barton, Duer & Koch Paper Co. .1020

Rope Manila

No. 215—6,000 lbs., 24x36—160; rolls, 48 ins. wide; diameter 28 ins. min., 30 ins. max. (3-inch fiber cores); min. order, 5,000 lbs.
* Paper Corp. of U. S. $.3145
R. P. Andrews Paper Co. .3523

No. 216—5,000 lbs., 24x36—280; rolls, 48 ins. wide; diameter 28 ins. min., 30 ins. max. (3-inch fiber cores); min. order, 5,000 lbs.
* Paper Corp. of U. S. $.3145
R. P. Andrews Paper Co. .3523

No. 2 Kraft

No. 218—20,000 lbs., 24x36—80; flat, cut any size, max. length 56 ins., in bundles wrapped and tied; min. order, 10,000 lbs.

No. 218—30,000 lbs., 24x36—100; flat, cut any size: max. length 56 ins., in bundles wrapped and tied; min. order, 10,000 lbs.

No. 218—65,000 lbs., 24x36—120; flat, cut any size; max. length 56 ins., in bundles wrapped and tied; min. order, 10,000 lbs.

No. 218—30,000 lbs., 24x36—140; flat, cut any size; max. length 56 ins., in bundles wrapped and tied; min. order, 10,000 lbs.

No. 218—30,000 lbs., 24x36—160; flat, cut any size; max. length 56 ins., in bundles wrapped and tied; min. order, 10,000 lbs.
Cauthorne Paper Co. $.07949
* .07699
* .07699
* .07699
* .07699
Mead Board Sales, Inc. .08
(on all quantities)
* Frank Parsons Paper Co. .0789
.0779
.0789
.0789
.0799

No. 219—5,000 lbs., 24x36—100; cut any size, folded (25 sheets per fold), in wrapped bundles; min. order, 5,000 lbs.

No. 219—10,000 lbs., 24x36—120; cut any size, folded (25 sheets per fold), in wrapped bundles; min. order, 5,000 lbs.

No. 219—25,000 lbs., 24x36—160; cut any size, folded (25 sheets per fold), in wrapped bundles; min. order, 5,000 lbs.
Old Dominion Paper Co. $.0818
(each quantity)

Cauthorne Paper Co..... .08099
(all three quantities)
* Mead Board Sales, Inc..... .08
* .08
* .08
(all quantities)

No. 220—40,000 lbs., 24x36—70/80; 9 and 11 ins. wide, min. 28 ins., max. 30 ins., in diameter; rolls, wound on wooden plugs, 1½-inch hole, or on 3-inch fiber core as may be specified with the order; min. order, 5,000 lbs.

No. 220—10,000 lbs., 24x36—70/80; 12¾ ins. wide, min. 21 ins., max. 22 ins. in diameter; rolls, wound on wooden plugs, 1½-inch hole, or on 3-inch fiber core as may be specified with the order, min. order, 5,000 lbs.

No. 220—20,000 lbs., 24x36—100; 36 and 48 ins. wide, min. 28 ins., max. 30 ins. in diameter; rolls, wound on wooden plugs, 1½-inch hole, or on 3-inch fiber core as may be specified with the order; min. order, 5,000 lbs.

No. 220—5,000 lbs., 24x36—120; 36 and 48 ins. wide, min. 28 ins., max. 30 ins. in diameter; rolls, wound on wooden plugs, 1½-inch hole, or on 3-inch fiber core as may be specified with the order; min. order, 5,000 lbs.

Old Dominion Paper Co.	$.0755	Sub. 70
		Sub. 80
	.0799	Sub. 70
		Sub. 80
	.071999	Sub. 100
	.071999	Sub. 120
Cauthorne Paper Co....	* .07549	Sub. 70
	* .07299	Sub. 80
	* .07549	Sub. 70
	* .07299	Sub. 80
	* .07049	Sub. 100
	* .07049	Sub. 120
Mead Board Sales, Inc.	.0775	Sub. 70
	.0750	Sub. 80
	.0775	Sub. 70
	.0750	Sub. 80
	.0750	Sub. 100
	.0750	Sub. 120

White Gummed

No. 252—400,000 sheets (ungummed), flat, cut 22x34 ins.; min. order, 25,000 sheets.
Whitaker Paper Co..... No. 36; $22.49 (per M sheets)
Paper Corp. of U. S..... 20.25 (per M sheets)
Bermingham Prosser Co..... 20.30 (per M sheets)
Old Dominion Paper Co..... 20.4399 (per M sheets)
* R. P. Andrews Paper Co..... 19.90 (per M sheets)
Frank Parsons Paper Co..... 20.94 (per M sheets)
Stanford Paper Sales Corp..... 22.50 (per M sheets)
Bulkley, Dunton Corp..... 22.18 (per M sheets)
Eureka Specialty Printing Co..... 25.70 (per M sheets)

25% Blotting, White

No. 254—10,000 lbs., 19x24—160; flat, cut 19x24 ins., in wrapped bundles, min. order, 10,000 lbs.

Whitaker Paper Co.....	$.1850
Walker, Goulard Plehn Co.....	.1793
Bermingham Prosser Co.....	.1800
Old Dominion Paper Co.....	.16578
Marquette Paper Co.....	.1770
Mudge Paper Co.....	.1650
Central Ohio Paper Co.....	.1818
Wilcox, Walter, Furlong Co.....	.1800
R. P. Andrews Paper Co.....	.1850
* Frank Parsons Paper Co.....	.1648
Bulkley, Dunton Corp.....	.1773

Desk Blotting, Colored

No. 255—30,000 lbs., light green, 19x24—200; flat, cut 19x24 ins., in bundles wrapped and tied, min. order, 10,000 lbs.

Whitaker Paper Co.....	$.1350
Walker, Goulard Plehn Co.....	.1369
Bermingham Prosser Co.....	.1375
Old Dominion Paper Co.....	.150646
* Marquette Paper Co.	.1321
Mudge Paper Co.....	.1323
Central Ohio Paper Co.....	.1388
Wilcox, Walter, Furlong Co.....	.1375
R. P. Andrews Paper Co.....	.1325
Frank Parsons Paper Co.....	.1498
Bulkley, Dunton Corp.....	.1323

High-Finish Red Wallet Board

No. 265—6,000 lbs., 24x36—320; flat, cut 38x48 ins., in bundles wrapped and tied; min. order, 5,000 lbs.

* Paper Corp. of U. S.	$.1548
R. P. Andrews Paper Co.....	.1544

High-Finish Chemical Wood Manila Tag

No. 271—80,000 lbs., 24x36—280; flat, cut 28x34 and 38x48 ins.; min. order, 20,000 lbs.

Whitaker Paper Co.....	$.1246
Walker, Goulard Plehn Co.....	.1294
* Paper Corp. of U. S.....	.1149
R. P. Andrews Paper Co.....	.1324

Jute Tag

No. 280—20,000 lbs., 22½x28½—200; flat, cut 34x44 ins., min. order, 10,000 lbs.

* Paper Corp. of U. S.....	$.1812
R. P. Andrews Paper Co.....	.1847

No. 281—10,000 lbs., 22½x28½—280; flat, cut 34x44 ins.; min. order, 10,000 lbs.

* Paper Corp. of U. S.....	$.1812
R. P. Andrews Paper Co.....	.1847

Manila Board

No. 282—20,000 lbs., 22½x28½—400; flat, cut 22x34 ins., with projecting colored-paper marker between each 100 sheets; min. order, 10,000 lbs.

Paper Corp. of U. S.....	$.0965
* Paper Corp. of U. S.....	$.0965

White Litho-Coated One-Side Cardboard

No. 300—25,000 sheets, 34x57 ins.; the grain to run lengthwise of the sheet; min. order, 10,000 sheets.
Paper Corp. of U. S..... $149.60 (per M sheets)
R. P. Andrews Paper Co..... 153.97 (per M sheets)
* Stanford Paper Sales Corp..... 135.26 (per M sheets)
Barton, Duer & Koch Paper Co... 136.63 (per M sheets)
Denny Paper & Board Co..... 142.11 (per M sheets)

Railroad Board, White and Colored

No. 301—25,000 sheets, white; flat, 22x34 ins., 4-ply, each 100 sheets fully banded; min. order, 10,000 sheets.
Whitaker Paper Co..... $60.00 (per M sheets)
* Walker, Goulard Plehn Co..... 57.23 (per M sheets)
R. P. Andrews Paper Co..... 60.00 (per M sheets)

No. 302—15,000 sheets, white; flat, 22x34 ins., 8-ply, each 100 sheets fully banded; min. order, 5,000 sheets.
Whitaker Paper Co..... $93.00 (per M sheets)
* Walker, Goulard Plehn Co..... 86.81 (per M sheets)
R. P. Andrews Paper Co..... 93.00 (per M sheets)

No. 303—5,000 sheets, white; flat, 22x34 ins., 14-ply, each 50 sheets fully banded; min. order, 5,000 sheets.
* Walker, Goulard Plehn Co..... $122.60 (per M sheets)

No. 304—50,000 sheets, ash gray, green, orange, and red, flat, 22x34 ins., 4-ply, each 100 sheets fully banded; min. order, one color, 5,000 sheets.
* Walker, Goulard Plehn Co..... $60.98 (per M sheets)

Wood Cardboard, Colored

No. 306—110,000 lbs., buff, 22½x28½—150; rolls, 20 and 23 ins. wide, 34 ins. min., 36 ins. max. (3-inch fiber cores); min. order, 40,000 lbs.

Whitaker Paper Co.....	$.0834
Walker, Goulard Plehn Co.....	.0869
Bermingham Prosser Co.....	.0950
Marquette Paper Co.....	.0885
Frank Parsons Paper Co.....	.0990
* Bulkley, Dunton Corp.....	.0815
Barton, Duer & Koch Paper Co...	.0918

No. 307—80,000 lbs., buff, 22½x28½—150; flat, cut 32x42 ins.; min. order, 20,000 lbs.

Whitaker Paper Co.....	$.0974
Walker, Goulard Plehn Co.....	.1029
Bermingham Prosser Co..... (Not less than 40,000 lbs.)	.1150
Marquette Paper Co.....	.0990
Frank Parsons Paper Co.....	.1100
* Bulkley, Dunton Corp.	.0935
Barton, Duer & Koch Paper Co...	.0993

No. 308—10,000 lbs., melon, 22½x28½—184; flat, cut 20x30 ins.; min. order, 10,000 lbs.

* Paper Corp. of U. S.....	$.0999
Bermingham Prosser Co.....	.1150
R. P. Andrews Paper Co.....	.1100

No. 309—90,000 lbs., blue, buff, green, melon, pink and yellow; 22½x28½—184; rolls, 20 ins. wide, 34 ins. min., 36 ins. max. (3-inch fiber cores); min. order, one color, 10,000 lbs.

* Paper Corp. of U. S.....	$.0999
Bermingham Prosser Co.....	.0950
R. P. Andrews Paper Co..... (10,000 lots)	.1000
R. P. Andrews Paper Co..... (40,000 lots)	.0975

Chemical Wood Tan Board

No. 310—200,000 lbs., 22½x28½—200; flat, cut 25x38 ins. grain long, 28x38 ins. grain short, and 34x44 ins. grain long; min. order, 10,000 lbs.

Whitaker Paper Co.....	$.1362
Walker, Goulard Plehn Co.....	.1273
* Paper Corp. of U. S.....	.1209
Mudge Paper Co..... (10,000 shipments)	.1479
Mudge Paper Co..... (50,000 shipments)	.1429
R. P. Andrews Paper Co.....	.1369

United States Postal Card Paper

No. 325—3,500,000 lbs., 22½x28½—188; rolls, 33 ins. wide, diameter 34 ins. min., 36 ins. max. (6-inch iron or metal capped returnable fiber cores); min. order, 40,000 lbs.

* Whitaker Paper Co.....	$.0998
(1,100,000)	
* R. P. Andrews Paper Co.....	.0970
(1,200,000)	
* Frank Parsons Paper Co.....	.0965
(1,200,000)	

No. 327—80,000 lbs., 22½x28½—18; rolls, 20 ins. wide, diameter 34 ins. min., 36 ins. max. (6-inch iron or metal capped returnable fiber cores); min. order, 40,000 lbs.
Whitaker Paper Co..... $.0998

Folding Bristol, White and Colored

No. 329—10,000 lbs., gray, 22½x28½—240; flat, cut 35x45 ins., the grain to run lengthwise of the sheet; min. order, 10,000 lbs.
* R. P. Andrews Paper Co..... $.1761

Pressboard, Colored

No. 351—6,000 sheets, red; flat, cut 30x36 ins., thickness .0140 inch; min. order, 5,000 sheets.
* R. P. Andrews Paper Co..... $19.29 (per C sheets)

No. 352—65,000 sheets, gray; flat, cut 29¾x34¾ ins., thickness .0300 inch; min. order, 5,000 sheets.
R. P. Andrews Paper Co..... $42.92 (per C sheets)
* Barton, Duer & Koch Paper Co... 27.33 (per C sheets)

Newsboard

No. 360—275,000 lbs., 26x38; No. 100; flat, cut any size, min. width 21 ins., max. width 42 ins. (To be guillotine-trimmed square on four sides.) Min. order, 10,000 lbs.

Whitaker Paper Co.....	$.04849
Paper Corp. of U. S.....	.04924
Old Dominion Paper Co.....	.049481
Mudge Paper Co.....	.04875
Mead Board Sales, Inc.....	.0495
* R. P. Andrews Paper Co.....	.0435
Stanford Paper Sales Corp.....	.0492
Denny Paper & Board Co.....	.0500

Binder's Board, No. 1 Quality

No. 366—[a]220,000 lbs., No. 1, 25¾x30¼ ins., Nos. 12, 17, 19, 21, 25, 31, and 41; flat, to trim 25x30 ins.; and 34x44 ins. (Nos. 12 and 21 only); min. order, 20,000 lbs. in combination of any of the above boards.

Whitaker Paper Co.....	$.07105
* R. P. Andrews Paper Co.....	.0619
Barton, Duer & Koch Paper Co...	.06425

No. 367—[b]50,000 lbs., No. 1, 25¾x30¼ ins., Nos. 21, 25, 31, and 41; flat to trim 25¾x37¾ ins.; min. order, 20,000 lbs.

Whitaker Paper Co.....	$.07105
* R. P. Andrews Paper Co.....	.0619

Chestnut Cover Board

No. 369—[a]220,000 lbs., 25¼x30¼ ins., Nos. 12, 17, 19, 21, 25, 31, and 41; flat to trim 25x30 ins., and 34x44 ins. (Nos. 12 and 21 only); min. order, 20,000 lbs. in combination of any of the above boards.
Mead Board Sales, Inc..... $.0645

No. 370—[b]50,000 lbs., 25¼x30¼ ins., Nos. 21, 25, 31, and 41; flat, to trim 25¾x37¾ ins.; min. order, 20,000 lbs.
Mead Board Sales, Inc..... $.0645

[a] Total tonnage to be awarded on Lots 366 and/or 369 will be 220,000 pounds. Award will be made in the best interests of the Government price-wise on comparable items of either Binder's Board, No. 1 quality, or Chestnut Cover Board.

[b] Total tonnage to be awarded on Lots 367 and/or 370 will be 50,000 pounds. Award will be made in the best interests of the Government price-wise on comparable items of either Binder's Board, No. 1 quality, or Chestnut Cover Board.

Value of Canada's Pulp and Paper Inventories and Shipments Up

A general increase in value of shipments and inventories is reported for Canada's pulp and paper industry in the results of the Canadian Government's latest nationwide survey of such operations.

Pulp and paper industry's shipments increased to 148.8 in March compared with 142.7 in previous month and 140.0 in same month a year ago, based on 1947 being 100. However, the value of inventories in this industry showed an even greater increase, rising to 260.1 in March as against 250.9 in preceding month and only 186.5 in same month last year, with stocks of raw materials, goods in process and finished products increasing during March.

Allen Abrams

Vice-President, Marathon Corp. appeals to us to

Save America for

The Third Generation*

The older members of our organization will recall the early days of the twentieth century. The United States had then experienced more than one hundred years of development—clearing land, exploring resources, building railroads and starting industry. We had fought the Revolutionary War to free ourselves from foreign tyrants; the War of 1812 to establish freedom of the seas; the Civil War to cut the bonds of slavery; and finally the Spanish American War to set free Cuba and the Philippines. We had cut loose from the tyrannical governments and the wars of old Europe. We had established an entirely new society on the Christian philosophy that the individual is supreme and that the government is his servant.

The young giant America was beginning to stir, flexing his muscles and measuring his strength. Yet this period had the slow motion of the horse and buggy, long hours of hard manual labor, limited means of communication, scant knowledge of world geography and withal few ulcers or heart failures. Even the styles were restrained—the men in tight trousers, throat-slitting collars, wearing elegant derbies, whiskers and gold teeth; the ladies swathed in layers of long heavy garments, high buttoned shoes, magnificent pompadours, with complexions much as nature had bestowed them—and paranthetically the men were still wearing the pants.

There was an atmosphere of expectancy. On every hand was opportunity for each man to choose the calling he would follow, the land he would cultivate, the business he would establish. It was his to initiate and his to reap the fruits of his labor. As in the Parable of the Talents, each man should prosper in relation to the talents he possessed and the use he would make of them. The middle member of a family of nine children, I remember that each of us had a schedule of duties to be performed. We looked forward to the opportunity of earning our own living and we had no illusions about providing our own security. The government was expected to do for us only those things which required collective action beyond our means to carry out.

So it was in 1900. Government was little to be seen either in uniform or in the laws and penalties which it imposed. Incredible as it may seem, with a population of 75 million people, the cost of our national government was only a half billion dollars per year and the national debt was little over one billion dollars. The word bureaucrat was unknown. A man could start his business and run it, with scarcely a federal official to be seen. If the business failed, as too frequently happened, the loss was his own. If through the use of hard money and hard labor a citizen succeeded in making an honest profit, that belonged to him. To the government he paid his fair share for the support of essential services, but there were no formidable reports to make out nor did a swarm of government agents breathe down his neck to harass and befuddle him.

This incentive plan was now impelling men to create more goods, abolish drudgery, alleviate poverty and to make people live longer and happier. Through these great developments the United States prospered and was becoming a world power. Conscious of her obligations the country went to war in 1914 that we might save the world for democracy. But we reached no solution, for the old European conflicts were not to be resolved so easily; nor in World War II were we able to quarantine the aggressors successfully.

Now once again we have elected to shoulder the responsibilities of the world. It is as though our neighbor's house catches fire. Having an antiquated water system he calls on us to put out the blaze. Then with the conflagration under control we find that our own house is afire on the inside; yet with a curious sense of generosity we continue to pour water on our neighbor's fire whilst our own home is in danger of burning down.

Observe just one of several events, the consequences of which are threatening America from within. In 1913, after a sufficient number of states had ratified the 16th Amendment, a seemingly innocuous law was passed by Congress permitting a levy on the income of individuals and corporations. Count von Bernstorff, then German Ambassador to the United States said, "You have adopted an income tax. That is the beginning. You will have more and more burdensome taxes. What amazes me is that your people seem intent upon following our example, instead of developing the system provided by your constitution. Wait a few years and see the result."

Von Bernstorff may have been a poor diplomat but he was a good prophet. Beginning in 1914 with a very modest share of the citizens' earnings, this tax is now extracting from individuals alone more than 27 billion dollars per year or 450 dollars for every working person in the country. Now, let it be clear that no reasonable citizen will complain of paying his fair share of the amount needed to maintain the necessary services of government; and to care for those who, through misfortune or inability, can not support themselves. Today the income tax levy is no longer used for such purposes alone but it has become a political instrument to penalize the go-getter and to reward the loafer.

In their desire for power, men and parties will promise the voter unlimited benefits and services. Once elected, these fantastic promises are impossible to keep except through constantly increasing taxes and eventually through mounting debt. When at last the voter becomes alarmed over taxes and debt there is but one course by which he can be kept employed and yet less concerned over high government expenditures. That course is for the government to declare that we are faced with a national crisis—a threat of impending war. Once preparations have been started to meet this emergency, war has, at least in the past, always resulted. It happened in Italy and Germany; it has happened in the United States and it is happening again at this moment.

Now you begin to see what has been developing in this country during the past fifty years. Steadily and without too much fanfare your federal government has moved in to tax away more of the earnings of the citizen. Then two decades ago, in a time of emergency, the executive branch commandeered from the Congress a substantial portion of the federal budget. Undoubtedly these men were motivated by

high purposes for they set up many necessary and worthwhile measures of relief and support. Had they stopped at that point, all might have been well, but the politicians had found a medium by which they could manipulate votes and from that time on the medium has been used effectively.

The average taxpayer now yields to his government from 30 to 40% of his income. In fact someone has defined a financial genius as one who can make money faster than the government can take it away. The wage earner can take out no insurance until first he buys so-called social security with money which his government then spends currently, so that at some time in the future this will have to be collected all over again. By its fiscal policies your government regulates national spending and credit, so that in 10 years the value of the dollar has ben cut in two. For example, the retirement insurance which you bought in 1940 will buy today just half what you had anticipated. The federal government is already in strong, direct, subsidized competition with the private industry on which you rely for a livelihood. Thus, 20% of all electric power is generated and sold by the federal government and schemes are afoot to double this amount. Your public schools, for training the young minds of future citizens, are under pressure to accept federal subsidy, which can lead to federal thought control.

Thanks to your tax dollar, more people are going on the federal payroll, thus to become tax-consumers instead of tax producers. In 1944 the peak year of World War II, there were 1,250,000 civilians on the federal payroll. Right now in 1952, a year of supposed peace, this number has doubled to more than 2,500,000 and the list is going up at the rate of 1500 persons every day. Expressed another way, in 8 years we have additional government employment to the extent of about 6 billion dollars. Of these federal employees, 250,000 work in Washington and the rest are distributed over the nation. By such means the federal government has expended needlessly and has taken from the states many of the functions given them by the Constitution. Try this yoruself—pick up the telephone book in your own city and compare the number of telephones listed under the federal government with those listed under your state government. Here are some that I have checked: for each 100 telephones listed under the particular state, the federal government had the following number of telephones—in Detroit 170; in San Francisco 220; in Chicago 270; in Minneapolis 330; in Cincinnati 370. Even in my own little city of Wausau, with 32,000 people, there were 6 times as many federal as state listings. It will interest you to know that Wausau has offices for the Department of Labor, Civil Aeronautics, Collector of Internal Revenue, Farmers Home Administration, Federal Bureau of Investigation, Organized Reserve, Post Office, Social Security, Air Force, Federal Judge, Marine Corps Recruiting, Navy Recruiting, Probation Officer and Veterans Administrator.

You and I will agree that many of these services are needed and warranted. Probably we shall admit that some of these additional services might be justified, had we the ability to pay for them. Yet, do you not find a familiar ring in this phrase from the Declaration of Independence, "He has erected a multitude of new offices and sent hither swarms of officers to harass our people and eat out their substance?" Although most of these people are under civil service is it likely that they will risk their own future by voting wrong?

The situation seems clear to me. In fifty years the United States has moved steadily away from the principle of individual freedom as conceived by the founding fathers, back toward the old European philosophy that the state is more important than the individual. Karl Marx had said a century ago, "The democratic concept of man is false because it is Christian." Only recently Hitler too had said, "I oppose with icy clarity the Christian doctrines of the great significance of the human soul."

Put it more bluntly. Your own federal government, under the guise of protection and benevolence to its people is putting over the greatest swindle of the ages. The United States is financially bankrupt. Every day we go in debt deeper by spending your tax money to build a railroad on the African Gold Coast; to construct power dams in Indo China; to build commercial airports in Egypt; and of all things to teach the Southern Koreans how to balance a budget! These, and thousands of other projects which would exhaust you mentally as well as financially. You have observed too that our country is moving rapidly to moral bankruptcy. Review the Kefauver Crime investigations, and the Fulbright examination of the Reconstruction Finance Corporation, with trails of intrigue and graft and corruption leading even to the White House. For the President himself has supported the Pendergast Club which brazenly stole the Kansas City primary. Note carefully that Hiss, Coplon, Rosenberg and a host of other traitors have penetrated our government, stolen our secrets and peddled them to our enemies.

By this time you will agree with me that we need a second Declaration of Independence. Suppose then we invest our government with a masculine personality and express our grievances of him as follows: He has departed from the American concept of the dignity and freedom of the individual and is reverting to an all powerful government; he has interpreted the Constitution to his own ends; he has taken away state rights; by subterfuge he has deceived his people; he has debased the courts and defied the legislature; he has used the power of taxation to punish incentive and to destroy initiative; he has permitted, if not encouraged, corruption and crime; he has set class against class; he has allowed the spies of a foreign government to infiltrate our agencies, to steal our secrets and to foment revolution against our society; he has indulged in cheap and sordid politics; he has built a multiplicity of agencies to harass our citizens and to waste away our substance. We the people of these United States therefore, appealing to the Supreme Judge of the world for the rectitude of our intentions, solemnly publish and delcare that we are, and of right ought to be, free and independent people, to be governed honorably and according to the Constitution of the United States; and for the support of this Declaration we mutually pledge to each other our lives, our fortunes and our sacred honor."

Nothing short of such a declaration will accomplish our purpose, because you and I are primarily responsible for what is happening. We have been negligent, slothful, unwilling to accept our responsibilities as citizens. If our country is now to be saved—and I measure these words—you and I alone can save it. Believing that our system is best, then each of us must become the finest salesman in the world. Let us go up and down the highways and byways, educating the voter—the teacher who tells our children about our country; the worker in our factory who hears all too little of the real story of America; the housewife who makes our homes; the young man and young woman whose eyes should be on future opportunity rather than government security. We shall do this simply and honestly, admitting our shortcomings but declaring that no other system yet devised has offered such freedom and opportunity as we enjoy.

I am not so naive as to believe that our country can be preserved by resounding declarations or that corrupt, entrenched politicians are unseated by pious platitudes. I know that we must talk with the man on the street, who is very likely to say that he has never had it so good. It becomes then our task to convince him that he is selling his birthright for a mess of pottage—that this grand spree of ours will have a day of reckoning. Let each man of us choose, in the American tradition, the party and the candidates who best represent the principles for which he stands. Then let each one of us go to work. For in this year of 1952 you and I shall determine the kind of a world in which our grandchildren—the third generation—shall live.

In this atomic age we stand literally on the threshold between darkness and light. Man has unleashed the forces which hold the universe together and which can destroy it. This great experiment of America is really

in mortal danger of collapse. Heed well the words of the philosopher, John Stuart Mill:

"A people may prefer a free government, but if, from intolerance, or carelessness, or cowardice or want of public spirit, they are unequal to the exertions for preserving it; if they will not fight for it when it is directly attacked; if they can be deluded by the artifices used to cheat them out of it; if by momentary discouragement or temporary panic, or a fit of enthusiasm for an individual, they can be induced to lay their liberties at the feet even of a great man or trust him with powers which enable him to subvert their institutions; in all these cases they are more or less unfit for liberty; and though it may be for their good to have had it even for a short time, they are unlikely long to enjoy it."

You and I will save America if we have the desire, the courage and the will to dedicate ourselves to that task. God grant that we may have!

---

* Presented at the 33rd Annual Convention of The American Pulp and Paper Mill Superintendents Association in Detroit, Mich.

Phillip J. Bowen

Great Lakes Steel Corp. talks to

The Key to the Safety Program —The Foreman

May I talk with the foremen for a few minutes? I don't want to talk to the "boss." According to Webster, the boss is a dictator, a taskmaster, one who demands obedience at the crack of the whip, one who uses leadership arbitrarily. Thank God that that type of a supervisor is well on the way out. Today, his place is taken by one who leads, one who instructs, one who recognizes that the men working for him are thinking human beings, one who is a REAL foreman.

Let's consider the men you direct or supervise. They are God's masterpiece of creation—human beings. Materials and machines are inanimate objects—of no value until they are manipulated by the workers. These workers are men with the ability to think and who, despite opinions to the contrary, possess an inherent desire to serve and give of their best. They work for the same reasons we do—that they may care for their obligations, that they may provide for their loved ones. In dealing with them, let us not lose sight of this one fact "For whether we live, we live unto the Lord; or whether we die, we die unto the Lord: Whether we live therefore, or die, we are the Lord's."

We boast of the wealth of this nation, of its material resources, of its great productive ability, of everything except its real wealth. The real wealth of any nation is the people who make it up. They are the dynamic power that makes a nation, a city, a community. The success of an industry, of any community, of any nation depends upon the manner in which we who are in supervisory positions handle its wealth—the workers!

You have come to occupy your position of responsibility as a supervisor because management felt that you possessed those abilities which would enable you to handle those persons under you in the best possible manner for themselves, the company and the community of which they are a part. When a foreman accepts his position, he immediately becomes responsible for

(1.) the physical condition of his department and related territory;

(2.) the proper care and maintenance of all equipment that he uses;

(3.) quality production at minimum costs; and

(4.) the building of a well-integrated, trained, productive group of workers who are safety-minded.

Imagine a line of ambulances from New York to Chicago, bumper to bumper and six patients in each ambulance. There's the picture of the number of human beings injured each year in industry. It took something like that to arouse management to a sense of the importance of safety and the safety program in industry. And at long last, it has also come to recognize that a functioning safety program can only be successfully operated when the foreman is given the responsibility for it.

There isn't time for me to go into the details of the first three responsibilities of the foreman that I have named; but it is an interesting fact that the same factors that will enable him to carry out the fourth one work equally as well in the other three. Let me be a foreman for a few minutes. How can I best build a well-integrated, trained, productive group of workers who are safety-minded? Gentlemen, in all seriousness, let me say, it CAN be done. With all modesty, I say I have done it. And, better, I have seen it done scores of times. It is relatively simple.

1. I must always set the example—What I do speaks so loud that they can't hear what I say.

2. I must gain the confidence and faith of each man. As soon as he enters the department, I will recognize him as an individual; I will let him know that I am sincerely glad to see him there; I will be interested in his well-being, his family, his hobbies; I will introduce him to one or two of his associates; I will let him know that my office is run on "the open door policy"; give him a general outline of what his job is and the most efficient and safe way of doing that job; tell him the why and the wherefore of it all; I will check with him daily for a few days—each day putting a little more emphasis on why I stress safety; let him know, as he becomes more familiar with the job, that it is his responsibility to work safely, not only for his own sake but for that of his co-workers; I will get across to him early that his job is important in the overall picture—a sweeper in the department is just as important as the key man there; careless work, leaving litter around may cause the loss of a life or limb to some unfortunate fellow worker.

We sometimes fail to realize that every man has an innate sense of pride; he wants to feel that he is needed, that his work is important. When I as his foreman can make him see that I believe he and his work are an integral part of my department, I have gone a long way towards winning his confidence and loyalty. Give me a loyal crew of workers, and I'll break all records in my department—production, costs, and safety! The men do it—I don't.

The safety problem for the foreman is solved only through personalized effort. It can be done. It has been done at our own plant. Our Vice-President in Charge of Personnel, Mr. J. J. Jeffrey, together with his staff, has developed such a program and it works. Here it is:

Departmental supervision is responsible for the successful operation of a safety program in their respective departments. Departmental supervision is listed as follows:

1. Superintendent
2. Assistant Superintendent
3. General Foreman
4. Turn Foremen
5. Assistant Turn Foremen
6. Pushers or Leaders

Specifically these responsibilities are as follows:

PERSONALLY see that all present and new employees receive proper safety instruction relative to their specific jobs and duties.

PERSONALLY see that the above-mentioned safety instructions are understood and adhered to by constant follow-up.

PERSONALLY understand and see that each supervisor for whom you are responsible clearly understands and strictly observes the established regulations. Pass along such understanding to each employee in such manner that he willingly puts into effect such safety practices for the benefit of himself and his fellow workmen.

PERSONALLY make constant inspections of the department for the purpose of eliminating unsafe conditions and correcting unsafe practices.

PERSONALLY see that all employees are provided with the proper safety equipment and that such equipment is properly used.

PERSONALLY see that each employee does his work in a safe manner and under safe conditions.

PERSONALLY see that all supervisors are familiar with all safety reports, safety statistics and other safety data relative to the safety program in the plant and the department concerned.

PERSONALLY see that meetings are periodically held for the purpose of stimulating interest and passing on information relative to the safety program.

PERSONALLY see that all supervisors are safety conscious at all times and that they emphasize to each employee at every opportunity good safety practices.

PERSONALLY see that cleanliness and orderliness are maintained in the department at all times.

PERSONALLY see that accurate reports of meetings, accidents, near accidents, injuries and other safety matters are made out and forwarded to the proper personnel.

The Safety Department is available to all supervisors for the purpose of assisting and advising them in the carrying out of the safety program. The above enumerated responsibilities do not exclude any other responsibilities consistent with a successful safety program.

Presented before the Annual Convention of The American Pulp and Paper Mill Superintendents Assn. held at Detroit, Mich.

D. R. Simonds

Beloit Iron Works, presents the machine builders viewpoint of

Inlets and Slices*

I have been asked to speak to you on the subject of inlets and slices, particularly from the viewpoint of the machine builder. You may well ask why is the viewpoint of the machine building different from that of the operator.

In the first part of my talk, I will give some figures to reveal the extremely wide range in requirements that must be met by the machine builder. At the same time, I will list the requirements common to all mills that the machine builder must meet no matter what the weight, grade, or speed, or type of stock.

In the second part of my talk, I will deal with the various requirements for approach flow to the slice, with the performance factors that affect the design of the slice itself, and will answer several questions which have been asked by your committee.

In the third part of the talk, I will discuss, in some detail, a comparatively new development, the Beloit air-cushioned inlet; and will attempt to show why this inlet conforms to the requirements for good operation.

Author's Note

The wide range of flows encountered may be illustrated by citing a few examples. There are kraft bag machines running with a total flow to the headbox of over 20,000 gallons per minute. This volume gives a flow per inch of width of approximately 90 gallons per minute. Going to the other end of the scale, a machine of about 100 in. width, running a special tissue at moderate speeds with a total flow of 1400 gallons per minute, has a flow per inch of width of 14 gallons per minute.

Mid-way of these extremes is a Yankee tissue machine of about 175 in. width with a total flow to the headbox of 8300 gallons per minute. This volume gives a flow per inch of width of 48 gallons per minute.

Another extreme is a fine rag-content bond paper machine 120 in. in width with a total flow to the headbox of about 1000 gallons per minute. This volume gives a flow per inch of width of about eight gallons per minute.

How do these flows in gallons per minute or per inch of width relate to headbox consistency (another variable)? The wide machine making kraft bag paper runs a headbox consistency of 0.35 percent. The Yankee tissue machine with a flow per inch of width of 48 gallons per minute has a headbox consistency of 0.2 percent or even lower. In the case of the machine making fine rag-content bond papers, the headbox consistency ranges from 0.8 percent up to over 1 percent, depending upon the weight.

It is apparent that, even on the same grades of paper, there is a wide difference in headbox consistencies. This difference is a function of the design of other parts of the paper machine. For example: Headbox consistencies are greatly affected by the type of stock and by the stock treatment; also, by wire length, number of suction, boxes, and other variables.

To sum up: The chief factor confronting the designer is the volume of flow per inch of width. This volume is determined by the production rate and by the consistency. These factors, in turn, are affected by the design of the rest of the paper machine and by mill practices. Even in the

same mill, there may be a very wide range of flows to cover weight and grade changes.

The machine builder also is confronted with the many requirements common to all mills in designing a proper inlet and slice. Some of these requirements are

(1) Minimum down-time for washups—which means freedom from accumulation of foam and slime lumps, in short, a box that is inherently clean.

(2) Accessibility for cleaning, and a headbox in which all parts and surfaces are easy to clean.

(3) A headbox with auxiliaries designed so that adjustments are both easy to make and effective; and where as much of the operation of the headbox as possible is automatic.

(4) Freedom from corrosion — a common requirement of all mills on all grades of paper.

(5) Compactness of the whole unit —as little space as possible should be taken up by the inlet and slice.

(6) Uniformity of delivery from the inlet to the slice—most important since it assures uniform weight and caliper.

The importance of the approach flow to the slice cannot be emphasized too strongly. The slice can't correct boils and cross-currents which are brought to it by a faulty design of headbox. If the approach flow to the slice is uneven in velocity, and has cross currents, the only thing that the papermaker can do is to adjust the flexible slice lip. It is impossible to set a flexible slice lip to eliminate boils and crosscurrents resulting from faulty design of inlets or headbox. These disturbances are changing locations constantly. Each minute, they are in a different place than they were a minute before.

The slice lip itself should be regarded mainly as an orifice to obtain the jetting velocity necessary to issue the stock from the slice at a speed corresponding with wire speed.

A definite distinction should be made between an approach flow in the headbox to the slice which is turbulent and full of boils and crosscurrents, and a flow which is perfectly smooth and glassy in appearance. The latter is no more desirable than the former; the approach flow to the slice should be lively or active—not turbulent, and not streamlined and glassy. It should be free of cross currents and boils, and rolling, such as is caused by baffles in a headbox.

All types of slices have been used on Beloit machines. However, Beloit has concluded that the straight vertical slice is desirable for most machine applications. It is the easiest to keep clean and the simplest to adjust.

Beloit has adopted rectifier rolls as the only satisfactory means of eliminating cross currents in a headbox and for kepeing th flow through the headbox in a lively condition. Guide vanes, egg crates or pin racks are unsatisfactory. They catch fibers and cause lumps. They also have a low order of effectiveness in straightening out cross current flow.

The rectifier roll, when properly built, is self-cleaning; and is very effective in eliminating cross currents. The number of rectifier rolls, their direction of rotation, their speed of rotation and their spacing are all very important to the approach flow.

Beloit has carried on research work with a full scale model of an inlet and slice over a period of two or three years. This model has had many arrangements of baffles, humps, and rectifier rolls—following many ideas from headboxes which have been built over the years.

Operation of the model has revealed that a rectifier roll creates a cone of disturbance downstream for a distance of approximately the diameter of the roll. If a rectifier roll is placed too close to the slice, this cone of disturbance will follow through to the slice.

Two rectifier rolls, arranged in an arc about the slice opening as the center, will force all of the stock to pass through them. Such an arrangement gets the rolls far enough away from the slice; and allows the disturbance to blend and die out before the stock issued from the slice.

Research with the model also has demonstrated that headbox proportions vitally affect a proper approach flow to the slice. The paper stock is introduced into the headbox through a vertical compartment designated by Beloit as the rising chamber. This chamber is equipped with a rectifier roll with a variable speed drive.

The roll provides the first step in the elimination of cross currents resulting from the entry of the stock into the headbox. It has been found necessary to vary the speed of the roll for different grades and consistencies of stock.

The vertical direction of the stock in the rising chamber is important. It gives an upward inertia to the whole mass before it turns at right angles to flow in the machine direction. This change in direction of flow aids in bringing air bubles to the surface where they can break and thus no longer remain in the flow of stock to form slime lumps.

As soon as the stock has turned in the machine direction, it is made to pass through a two-roll rectifier roll arrangement. In this arrangement, one roll is positioned on top of the other, and together they serve to further straighten out the flow of stock in the machine direction, and to prevent settling of any fiber or filler.

As soon as the cone of disturbance from these rolls has blended and died away, the stock flows through another set of two rectifier rolls arranged in an arc about the slice opening as the last stage of straightening out the flow. There still is space enough between these rolls and the slice so that the cone of disturbance thus created can blend and die away as the stock issues from the slice opening.

There are two other very important factors at the slice itself which have a great bearing on the formation of sheets of paper. They are: the position of the mtal apron board lip, or apron cloth, which is found to be widely divergent on different grades of paper; and the position of the slice lip in relation to the apron board lip, this latter variable having a very marked effect on the degree of pressure formation that is possible on the wire directly after the top centerline of breast roll.

In all Beloit designs of slice, the top slice lip is adjustable in or out relative to the apron board and to the centerline of breast roll.

In the Beloit air-cushioned inlet, as has been described for the model inlet, the stock enters through a rising chamber and passes through a rectifier roll. A variable speed drive on this rectifier roll thoroughly mixes the stock as it enters the inlet and starts to straighten out its flow.

All the rectifier rolls of the inlet are made up with vanes in the direction of flow to prevent cross currents. The stock rises vertically in the rising chamber and turns once only into the machine direction. It flows a short distance; and then is forced to pass through two rectifier rolls at the center of the box, one located above the other.

The level in the inlet is maintained by air pressure above the stock in an amount sufficient to keep the level of stock just an inch or so below the top of the upper rectifier roll. There is enough space between the center rectifier rolls and the final two rolls to die down before the stock gets to the rolls at the slice.

All the stock is forced to go through the last two rolls. These rolls are inclined and placed so that there is only running clearance between them and the slice and the bottom of the box. For a machine running on a range of grades and weights, it is advisable to use variable speed drives on both of these rolls at the slice.

The most usually asked question about this inlet is, *How does it work?"* Here is the answer: The air pressure within the box has to do only with the maintaining of a desired stock level in the box. All of the stock that is pumped into the box must go out through the slice. The only controls over the volume of flow through the box are the usual controls common to any headbox and slice, namely—the opening and closing of the valve from the fan pump, and the control of the slice opening.

At the desired stock level, just below the top of the upper rectifier roll at the center of the box, is a hole in the side of the box piped up to the outside. The cover of the box seals the entire box so that it is air tight. In the cover is an inlet pipe of small diameter to which is connected a small air compressor, usually a Nash pump

requiring about a 10hp motor. This pump supplies constant volume of air to the interior of the box in the space above the stock level.

If the stock level should start to rise, for instance, if the machine-operator opened the valve in the main line from the fan pump, the stock would close off the small exit pipe in the side of the headbox. This closure would decrease the amount of air escaping from the box. Then, since a constant volume of air is being pumped into the box, the air pressure above the liquid would rise and push the liquid level down.

This action is exactly the same as that which occurs when an operator opens the valve in the main line from its fan pump in an open box. In the open box, however, the hydrostatic head or liquid level actually rises; whereas in the air pressure box, the equivalent rise is taken care of by the increase in air pressure above the constantly maintained liquid level.

If the machine operator should open the slice, more stock would tend to flow out of the inlet and thus tend to reduce the level. When this situation happens, the exit pipe is uncovered. Thereupon, more air can escape from the chamber in the box.

Since a constant volume of air is being supplied to the box, the escape of air will reduce the pressure above the stock level. Also, it will cause the level to return to the point midway of the outlet pipe where it reaches equilibrium. In this manner, the stock level is maintained automatically at the point at which all flow approaching the slice must necessarily pass through the rectifier rolls in the box.

A water column, connected to a pipe tap at the bottom of the air-cushioned headbox, and sufficiently high to permit the liquid level to rise as would a similar gauge column attached to a pipe tap at the bottom of an open headbox.

The question might be asked, "What happens when the desired head for a proper wire speed is lower than the top of the upper surface of the upper rectifier roll?"

In this case, by a simple switching of valves in the piping to the air inlet, the Nash pump becomes a vacuum pump instead of a compressor. In other words, the air inlet, when under pressure, becomes a bleed-in port; and the air outlet, when under pressure, becomes the suction connection to the vacuum pump.

A transparent Lucite tube is placed in the piping connection to the port in the side of the headbox where the stock level is maintained. In operation, either under pressure or vacuum, the flow through this Lucite tube is always in the same direction. This flow can be clearly observed; and should always show a mixture of air and water going out through the side connection of the headbox.

In operation under a vacuum, the vacuum pump is drawing air out through the pipe in the side of the box. Again, if the liquid level should tend to rise, the air outlet would be reduced in area; and the amount of air being withdrawn from the box would be decreased.

Since air is admitted through a constant bled-in port, the vacuum existing above the stock level would decrease and the liquid level would drop. This operation is completely automatic and something which the machine operator does not have to adjust or attend to in any way. The adjustments that the machine operator makes with this air-cushioned inlet are the same as he would make with an open headbox. To change either consistency or speed, he manipulates either the main valve in the line from the fan pump or the slice opening.

If the sheet is drying up on the wire ahead of the suction boxes, and he wants more water in the sheet, he opens the valve in the line from the fan pump. If the sheet is too wet and is carrying on beyond the suction boxes before drying up, he reduces the amount of water coming from the fan pump. If the speed of the stock issuing from the slice does not suit the operator in its relation to wire speed, and he wishes to change it, he merely adjusts the slice opening just as he would with any headbox

The rectifier rolls at the center of the box are positioned so that as the stock turns the corner, so to speak, from the rising chamber, and starts along in the machine direction through the headbox, it is kept stirred up to prevent heavy fillers from settling out. These rolls also tend to even out any inequalities in stock velocity either in the machine direction or across the machine by throttling the flow. The vanes in these rolls also prevent any tendency for the stock to swing or skate.

The rectifier rolls near the slice are so spaced in relation to the rolls at the center of the box to keep the stock uniformly dispersed as it enters the slice and goes out into the wire. The stock accelerates uniformly across the full 90 degree arc from the two rolls at the slice down toward the slice opening.

Complete accessibility is provided to the headbox. There are no dead pockets or corners or projections where stock can catch. Every part of the inlet and slice coming into contact with the stock is made of stainless steel. This material is polished to a high finish; and every effort is made to avoid any projection burr or rough spot at any point in the box which might start to collect fibers and sooner or later cause lumps.

The rectifier rolls are rubber-covered. They offer no corrosion problem. All holes in the rubber coverings have rounded edges. Such edges make the rolls self-cleaning.

Showers are placed under the cover of the box. They wash the cover and sides and ends of the headbox continually. There is no possibility for fibers to accumulate at any point in the box.

Since the showers are always at the same distance from the stock level, their best efficiency in keeping down foam accumulations can always be maintained.

Complete adjustability of the slice is provided for in both the in and out in the machine direction and up and down in the vertical direction. Spaced at narrow distances across the machine are the usual slice orifice adjustments for warping the flexible slice lip.

* Presented at the 33rd Annual Convention of The American Pulp and Paper Mill Superintendents Association in Detroit, Mich.

Orr Felt Entertains Miami Valley Superintendents

On June 6th, The Orr Felt & Blanket Co., Piqua, Ohio, again entertained the Superintendents of the Miami Valley Division.

Chairman, E. H. Bindley of The Cheney Pulp & Paper Co., Franklin, Ohio, presided and the following officers were elected for the year, 1952-53: Chairman — Bernard L. Merriss, Oxford-Miami Paper Co.; 1st Vice-Chairman—George R. Lydick, Beckett Paper Co.; 2nd Vice-Chairman — Dean W. Newell, Philip Carey Co.; Secretary-Treasurer — James Ozias, Oxford-Miami Paper Co.

The talk of the evening, following a most delightful banquet, was given by Glen Sutton of the Sutherland Pulp & Paper Co., Kalamazoo. The evening meeting also featured the distribution of golf prizes for afternoon play.

The ladies in attendance were entertained at lunch and dinner at Hotel Ft. Piqua.

Present were approximately 250 members and guests.

Fish Feast Marks Rayonier Timber Contract

Rayonier was the high bidder at a public auction conducted by Raymond H. Bitney, Superintendent, Western Washington Indian Agency at Hoquiam, Wash., June 17, for the logging of the largest tract of land ever made under Indian Service auspices.

Signing of the agreement was marked by a salmon dinner given by the Quinault Indian Tribe to officials of Rayonier Inc., which acquired the timber rights. Cleve Jackson, Quinault Indian Chief, tendered a prime specimen of Quinault salmon to Clyde B. Morgan, company president, to seal the bargain. The fish feast was preceded by signing of the agreement subject to approval by the Secretary of the Interior.

The Crane Creek unit, logging rights for which were acquired by Rayonier, comprises more than 35,000 acres in the Quinault Indian Reservation. It lies to the north of Grays Harbor, Wash., where Rayonier operates one of its three northwest cellulose plants. Under terms of the Indian service contract the land will be under strict forestry management over the 34 years of the contract.

Milton J. Hayes

of The American National Bank and Trust Co., Chicago, Ill.,

urges you to broaden your view of the

Financial Aspects of Paper Mill Operation

During a three-week trip through Western Germany, the author of these lines had the opportunity of seeing with his own eyes the rather severe lack of work in most papermills. Though lack of work is rather common at the moment with nearly all mills, it cannot be denied that the situation is worse with the makers of high grade fine papers. In one of the well-known fine paper mills we were told, that more than one third of the workmen had been dismissed.

This same situation can be found now in all west-European countries, in France, Italy, Belgium, Germany, Holland, England and in the Scandinavian countries.

Symbolic of the situation in western Europe is the story of kraft paper. Most European kraft paper-producers have to import their pulp from the Scandinavian countries. Ever-rising prices for pulp forced the paper mills to regularly increase their prices up to a point where large groups of consumers thought it better to restrict their use of multi-wall bags and other kraft paper-products. This was the beginning of a slow but steady fall-back of orders in the mills and this situation grew worse, as at the end of the year 1951 Northern papermills commenced to offer their kraft paper to the other European countries at prices which were considerably below the quotations of the home mills, forced to use the costly imported kraft pulp. In some cases, kraft paper was offered by the Scandianavian countries at prices below the price of kraft pulp for the Continental market. This situation, together with bad conditions in the large consuming industries, such as the textile, building and shoe industries, resulted in most European countries in a rather severe drop in kraft paper production, combined with falling prices. Though, however, we took the story of kraft paper as an example, the situation for most other paper grades was rather identical.

Topic of all chats with papermakers during these last weeks was about the "crisis" of this moment and the question, what are the causes of bad conditions and how long might they last. It cannot be denied that even a very small decline in demand in the United States is able to produce on the European market effects which seem to be a multiple blow-up of minor changes on the American market. Such an enlarged reproduction of an American market-change might have been the beginning of the West-European paper crisis of this moment. Changed insight in the possible effects of the Korean war and the impossibility of going on paying for paper prices which a rather low-payed European consuming public cannot afford, followed and may be the reason for clearing as much of the large stocks as was thought wise. At the same time, England, followed by France, Germany, Belgium and Holland, put a limit to prices for import-pulp, or at least used such a possible limit as an argument in their trade-negotiations- with the Scandinavian countries. This resulted in much lower prices for pulp, as much as 20% less.

The price-reduction made possible by this cheaper pulp had a psychological effect on the buyers, much like: wait and see, and it will be cheaper in some months. Buyers were generally right in thinking this, but now most European mills are in the midst of the effects of this attitude: no work, and paper is offered at prices which continue to show a declining tendency.

As is said before, the question how long this crisis may last, is of utmost importance to all. It is clear that stock will be at an end some day, and only slight indications of better conditions on the American market may be able to produce a new boom here. This is such a moot question that we think it better to state that most papermakers we had the pleasure to meet during the last weeks in Germany and in Holland, and the letters we got from our French and Belgian friends, indicate a unanimous opinion that this crisis has a good chance of being at its end near fall 1952.

I would like to pose three questions for your immediate consideration:

(1) Has the downtrend in sales of paper and paper products been stabilized?

(2) What is ahead for 1953?

(3) What should your company do to be prepared for the inevitable changes to come this year?

These questions might be asked by each of you under the general title "Financial Aspects of Paper Mill Operation." Financial aspects cover all the complicated processes leading up to the production line, the production line itself and the sales effort. Perhaps I make it sound like the most important element in paper making—although I am sure that you gentlemen know that the successful operation of the mill is the most important element in paper making. However, financial aspects and competent managerial direction are so closely interwoven that a successful top manager must master both.

I would therefore urge you to broaden your outlook and briefly view with me the general business landscape in order that we might be able to answer the provocative questions I have just raised.

It is therefore my intention to cover with you this morning, the following points relating to the paper industry and your place in the industry:

(1) Why you, as a plant manager, should be interested in the finances of the business.

(2) Some financial ratios for your guidance in comparing your own company with others in the industry.

(3) A short discussion of present economic conditions in the paper industry.

Why You as a Plant Manager Should Be Interested in the Finances of the Business

When I was considering this assignment, a member of your group emphasized to me the importance of the Paper Industry in our 20th century way of living. He mentioned that if

the paper industry stopped producing today, our entire civilization would shortly come to a halt—within a few weeks at most, chaotic conditions would exist. This was a dramatic example to indicate the dependence of all peoples and their transactions on the supply of paper. As a parallel example, I might say to you that without a continuous flow of money and credit to your plant it must necessarily close for there would be no funds to secure the large quantities or raw materials, labor, fuel, power and processing supplies which are needed to operate the mill. In your capacity as a plant manager, production—the most efficient production—is your primary duty. But that production consisting of all the materials, personalities, machines, planning, improvising, and evolvement of the end-product must eventally be reduced to an impersonal, so called "cold" set of figures. Figures showing dollars and cents of income and expenditures or the profit and loss statement, figures showing assets and liabilities, and figures showing the degree of efficient operation.

These figures after passing through top management hands, will finally end up at the desk of a commercial or investment banker and will be the main basis of judgment by such an individual concerning the operation of your plant. The banker has no other way of knowing your company and your operation, except by a study of the financial reports, and the continuous flow of money deepnds on the reaction of such individuals to the financial data.

It is therefore incumbent upon you to become interested in balance sheets and profit and loss statements; to be able to judge your own operations from such statements; to be able to make comparisons with the other companies in the business and to draw general and specific conclusions. This is not an easy matter—it requires time and patience to divorce your mind from the action of production and devote your attention to the study of financial data. If, however, your thoughts are ranging beyond your present duties—to points of high position—the mastery of this aspect of paper mill operation is essential.

Then, too, your devotion to such matters will not go unrewarded for you will find this type of knowledge beneficial in your own personal affairs. No man in a supervisory position today can afford to neglect the training and study required to understand, interpret and evaluate balance sheets and profit and loss statements. Poor reports indicate poor operation, poor operations will cause the withdrawal of credit and money from the business, and poor operations will finally result in a closing of the plant if such matters are not corrected.

Some Financial Ratios for Your Guidance

Our second consideration in this financial review of your industry is to list a few financial ratios for your guidance in the over-all comparison of your company with others in the same industry, and to assist you in judging the general business picture.

To be able to adequately compare your own company with others in the same industry and to arrive at certain conclusions regarding general business, the consideration of financial information is vital. There are numerous publications listing financial data in the paper industry. The following list is representative but by no means inclusive:

(1) "The Statistics of Paper"—American Paper & Pulp Assn.
(2) "Census of Manufacturers"—U. S. Dept. of Commerce
(3) "U. S. Manufacturing Corporations"—Federal Trade Commission and Securities & Exchange Commission
(4) "Ratio Studies of Manufacturing Industries"—Dun and Bradstreet
(5) Federal Reserve Board Index of Industrial Production

These publications should become part of your library to be used in the study of your industry.

For over-all business activity the Federal Reserve Board Index of Industrial Production is a good indicator —of course it tells you where you have been and not where you're going—but it is the best comprehensive index in use today. This index is published monthly and appears in all reputable financial journals. Sometimes predictions are made as to the months ahead by financial writers and such predictions are helpful in planning operations. In any event, use this index as a simple comprehensive guide-post for general business. If you keep a monthly record of the index a trend invariably becomes evident and you can guage your operations accordingly.

For specific studies in the paper industry the following ratios are important:

(a) Current assets to current liabilities
(b) Net profit on net sales
(c) Inventory to net working capital
(d) Inventory to current assets
(e) Cast to current assets
(f) Current debt to inventory
(g) Average collection period (days)
(h) Current debt to tangible net worth
(i) Per cent federal taxes to gross income
(j) Ratio sales to total assets

I have prepared a sheet listing these ratios which can be picked up at your convenience.

In addition to the above guides one should remember that in the paper industry there are certain factors peculiar to the industry. The heavy costs for production machinery and equipment—costs that mean an investment of over $27,000 per worker compared with an average of about $7,000 per worker for other industries. The costs of a single paper making machine in relation to output is for example, another factor peculiar to the industry.

Careful attention to the ratios I have described and comparison with your own company will give you a tangible clue as to the financial status of your own operations. I urge that you carefully review these factors, compare your company with others, and during the present period use the results to better your own operation.

A Short Review of Present Economic Conditions in the Paper Industry

Recently I had occasion to be reading a security review published by a prominent Investment Dealer, and under "Paper and Pulp" I found this comment—

"Paper equities are still considered vulnerable pricewise despite the retracement from the highs of early last year, and near term relative performance is not expected to equal the price action of the market."

This seemed to me to be an excellent summary of what has been happening in the paper industry for over a year. Everyone in this audience is acutely aware of the current level of production as compared with late 1950 and early 1951. Estimates of 1st quarter 1952 operation indicate that paperboard companies operated at 85% of capacity against 103% for the same period of 1951, while the industry as a whole was down 4-5% as compared with 1951. For the week ended May 31, 1952, paper production was reported at 85.9% of production as compared with 90.7% the week before and 99.6% for the same week of 1951. Paperboard production was down to 79% of capacity for week ended May 31, 1952 compared with 83% the previous week and 100% a year ago. Since the investment world is mainly concerned with *here* and *now* the mild warning about buying common stocks of paper companies is not unexpected.

If I may now repeat the comment mentioned above—

"Paper equities are still considered vulnerable pricewise despite the retracement from the highs of early last year, and near term relative performance is not expected to equal the price action of the market."

The interpretation to be made from this statement would be a warning that the industry is in a downtrend from recent high levels of production, and while some adjustment has been made to lower demand, further adjustments may be necessary. It is a warning but a rather mild one.

The writer was cautious because he was undoubtedly aware that the discussion concerned a vital, basic, and still dynamic industry. An industry that can make comparisons with previous high production years and show increases beyond all predictions. An industry whose total production climbed from 9,748,000 tons in 1929 to 12,671,000 tons in 1939 and to 24,980,000 tons in 1952—an increase of over 157% in 23 years! An industry, to be sure, that is sensitive to over-all business changes but one that moves ahead with

our greater industrial capacity, larger population and ever increasing demand for paper and paper products. An industry that contributed $18,000,000 in federal taxes in 1939 and $529,000,000 in 1950.

With these dynamic factors ever present why the caution expressed by the previously quoted financial writer? Is it due to over-extension of plant capacity?—to a weakness in the supply factor?—to a deteriorating financial condition?—or to a downward trend in general business? Let us look at each of these factors briefly.

Plant capacity of the paper industry has increased steadily from 1929 when the capacity was 11,963,000 tons to 1951 when the capacity was 24,227,000 tons. However, the industry has operated at 93% or higher of capacity in every year since World War II with the exception of 1949. In 1951 operations were at 103% of capacity. Yes—there has been an increase in production facilities—capacity for 1952 is estimated at 25,392,000 tons—an increase of about 5% over 1951 and about 45% increase over 1946. Perhaps a temporary congestion may exist—but it does not at this time appear serious. Demand should continue to expand on a long term basis and as the population grows and the per capita use of paper increases, present plant capacity should be in line with demand. The only "if" is the lag which would result from a general lowering of business activity.

What of the supply factor—so important in the paper industry—is that a weakness? With the degree of integration that has occurred since the 1930's, with the reforestation program of the industry, and with the southern pine development—supply is not a basic weakness at this time. Temporary conditions may occur during which time materials are in short supply—but the condition usually doesn't persist for long. Supply is therefore not a dominant factor today.

Is there a deteriorating financial condition?—and is this the weakness? We now consider a part of the industry that could spell ruin for some companies, especially during prolonged periods of slackened demand. However, all evidence points to no serious deterioration in financial condition at this time. The usual test of relationship of current assets to current liabilities indicates a comfortable position for the paper industry as a whole. For a certain selected list of companies in industry this ratio has been as follows:

1946—3.20 times
1947—2.45 times
1948—3.01 times
1949—3.08 times
1950—2.52 times

The five year average was 2.53 times, and this compares with the usual test of a 2 to 1 position. Furthermore, management tends to tighten up during periods of slow-demand and improve the current position. Oother financial tests such as inventory to total current assets, current debt to inventory and funded debt to net working capital have not greatly changed during the past few years.

There were however, two dramatic financial changes during the past 1½ years that in my estimation accounts in part for the cautious attitude toward the industry on the part of Investment Analysts. The changes were the impact of taxes—taxes with a capital "T," and higher operating costs since June, 1950. This matter is so important that I should like to spell out a few of the changes during the past year. The Federal Trade Commission and the SEC published figures recently showing the impact of taxes and higher costs on various industry groups during 1951. This is a good period for comparison because by that date the inventory profits following K-Day in June, 1950 has been pretty well reflected in earnings.

This study shows a decline, by quarters, in the net income after taxes, for the paper industry as follows: (and allied products)

4th Q 1950 Net Profit—186,000,000
1st Q 1951 Net Profit—177,000,000
2nd Q 1951 Net Profit—166,000,000
3rd Q 1951 Net Profit—123,000,000
4th Q 1951 Net Profit— 98,000,000

This decline in net income amounting to about 47½ in one year's time is drastic in any language. The start of the decline was from a high profit level, to be sure, but the sharpness of the drop is of concern to all in a managerial capacity. Two main factors—are responsible for this action—taxes and increased costs since the start of the Korean incident. Costs may come down a little in the immediate future, but the current per cent of taxes will stay with us for many months to come. During 1951 the industry has faced this trend in net income by strengthening its holdings of cash and U.S.A. Government securities. For example, the same report by the Federal Trade Commission indicates cash improved from $478,000,000 at the end of 1950 to $567,000,000 at the end of 1951 and U.S.A. Government obligations increased from $440,000,000 to $722,000,000. Both of these increases helped strengthen the companies against possible further declines in business and to make available funds to meet taxes accrued. These steps on the part of management show a positive action to meet a challenging situation.

In summary we might say that management in the paper industry has been acutely aware of the impact of taxes and higher costs and is making necessary adjustments to meet current problems. However, until this trend toward lower net profits is reversed or stabilized—caution must be exercised.

Our fourth and final consideration of current problems has to do with the present condition in general business. On the whole, business has remained at high levels for many months. The Federal Reserve Board Index of Industrial Production which I mentioned to you earlier has been as follows for certain selected months during the past two years:

June 1950—199 (Not reflecting Korean Crisis)
Sept. 1950—211
Dec. 1950—218
Mar. 1951—222 (Full impact of Korean Crisis)
June 1951—221
Sept. 1951—218
Dec. 1951—218
Mar. 1952—220
Apr. 1952—216
May 1952—214

This however, does not tell the whole story. Depression conditions exist in the textile industry and in certain of the appliance industries. The people are saving at an unprecedented peace time rate—and this is affecting department store sales and other types of consumer industries. The influence of general business activity on the paper industry should and must be evermost in your mind. There are many straws in the wind indicating lowered business activity and until something occurs to reverse this trend a careful watching of the economic indications is in order.

And now to summarize—can we say what's ahead for 1953?

One can of course, get as many opinions on the outlook for 1953 as there are experts. This much must be concluded however—the present trend as noted before is for somewhat lower business activity in the paper industry and probably in general business and until something happens to change the elements making up this trend, caution must be exercised. This is the time to watch for efficient changes that can be adopted to improve the profit margin—to spend more hours reviewing all controllable operations such as material purchase programs and wasted labor motion. This is the time to exercise judgment and mild caution. This is the time to consider the whole picture—the broad landscape of American business—and fit your conclusions into the pattern of your own plant and your own industry.

FINANCIAL RATIOS TO BE CONSIDERED IN THE STUDY OF COMPANIES IN THE PAPER INDUSTRY

(a) Current assets to current liabilities
(b) Net profit on net sales
(c) Inventory to net working capital
(d) Inventory to current assets
(e) Cash to current assets
(f) Current debt to inventory
(g) Average collection period (days)
(h) Current debt to tangible net worth
(i) Per cent federal taxes to gross income
(j) Ratio sales to total assets

The Federal Reserve Board Index of Industrial Production should be used to determine current level of general business activity in the United States.

Presented before the Annual Convention of The American Pulp and Paper Mill Superintendents Assn. held at Detroit, Mich.

Ecusta Plans Expansion

Ecusta Paper Corp., Pisgah Forest, N. C., are planning a $1,500,000 expansion program including an addition to the present mill.

Paul L. Phillips

President, International Brotherhood of Paper Makers, Albany, N. Y., tells

What Labor Unions Have Meant to the Paper Industry

We hear a lot these days about the "middle man" in all lines of endeavor — the middle man between the manufacturer and the user, between the grower and the consumer, etc., and it is a most welcome experience for me to meet with the "middle men" in the paper industry — the superintendents.

Between the irresistible force of the mill manager on one side and the immovable body of employes on the other, all the "super" has to do is get production. He is given limited authority over a group of employes, a labor agreement he doesn't understand, a pencil and a pad of requisition blanks, and then told to go out and "speed 'er up" another 50 feet. In the line of authority, he dwells in that twilight zone where he is neither high enough to make final decisions, nor low enough to pass the buck to someone else.

There is, of course, one compensating factor; he gets paid for it. The importance of the pay check is the one thing he has in common with the president of the company and the worker in the mill. Any disagreement, arising over the size of the figures, is a small matter which has been causing disagreements for a long, long time — since long before there were unions, by the way.

A couple of hundred years ago, European economists worked out a theory of wages which they called the "wages-fund" theory. Its primary tenet was that there is just so much money —a fixed sum—to be paid out in wages in any given economy. No matter how that sum might be distributed among workers, the total amount to be paid to all wage earners in all industries was fixed and unchangeable. The only purpose unions and collective bargaining could play in such a scheme was to take a larger portion and leave their fellows on short rations.

Needless to say, such a static concept of economics found little acceptance among trade unionists, and I might add that no self-respecting capitalist in America today would subscribe to such a stunted view of his capacities. The economists, too, abandoned it when it became clear that it did not fit the facts of economic life.

A number of theories sprang into being to replace this idea, but they all had one thing in common: all took a dynamic view of the economic organism. They recognized the factor of growth in individual enterprises, in industries, and in the economy as a whole. They breathed into the old, stagnant formula the vital element of progress.

Labor, itself, in earlier days had some stagnant theories of its own. One of these was called the "lump of labor" theory. It held that there was just so much work to be done, and after that — nothing. The obvious inspiration one would get from this gloomy premise is to make the present job last, spacing it carefully so as not to work yourself out of a job. We have all seen some modern application of this idea, and even though we do not endorse such practices we can sympathize with the fear of unemployment which gives rise to them. The fact remains—it is a partial waste of human resources, just as unemployment is a total waste, but cannot sustain itself in the face of progress.

We are fortunate in this industry that progress has been ours in such great abundance — not only in total production, but also in per capita consumption. The unions in this industry have kept in step with the march of progress, instead of resisting it. We are not in the same frail boat as one of our fellow unions, which goes to the extent of advertising what it considers the advantages of the "one-way beer bottle" over the tin beer can, and singing the praises of the milk bottle over the paper milk container. They do this by enumerating all the unwholesome ingredients that go into a paper container — wood fiber, parafin, glue, and even dirty rags.

No, there is no wages-fund here, and there is no lump of labor. The Paper Makers — and our sister union, the Pulp Workers — have a record of accommodation to technological changes that do credit to any organization. Our only aim has been that the workers in the industry shall share in its splendid progress.

It is, therefore, against a background of success that I speak to you today — successful management and successful unionism.

These two, working together, have benefitted the industry and all the people connected with it, including the pulp and paper mill superintendents, both directly and indirectly.

I do not mean, of course, that unions were formed to benefit superintendents. That is not so, although we do have in our organization some very effective foremen's locals.

Let us take a look at the facts.

The first benefits from unionism are those that tend to benefit the enterprise itself and put it on a sounder basis. The extent to which these benefits are realized is in almost direct proportion to the degree of acceptance of the union by management. In other words, as the president of a large paper company once told me, management gets the kind of union it is entitled to.

How can a union help a company do a better job of running an enterprise? Isn't management trained to make all the decisions needed to run a business? Why does it need advice from anyone else, particularly an outsider? These questions we've all heard. I'm sure I've heard them somewhat more than you have.

What is the answer to this? Superintendents, if you look at their job as a whole, are charged with the responsibility for quality production within certain cost limitations. To do this, they must handle men and machines. Now, if a machine breaks down, the cause can usually be located fairly precisely—a gear, a bearing, whatever it might be—but the cause of dissatisfaction in workers is a much more subtle thing and one that cannot be solved with a slide rule and a table of logarithms.

This is quite obvious. It is equally obvious that management, interested in

tie long-term health of its enterprise, wants to have a genuinely satisfied work force. Industrial workers in this country, by and large, have chosen the process of collective bargaining as a means of giving voice to their desire for improving wages, hours, and working conditions. Collective bargaining has been the public policy in this country for twenty years since it was first enunciated, in 1932, in the Norris-La Guardia Act.

Management, in many important segments of American industry — including the paper industry—has in varying degrees accepted and practiced collective bargaining intensively for a number of years, with wages, production, and profits continually rising. This being true, it must have some advantages, to the company as well as to the workers.

Let me give four or five reasons why I believe this is true:

1. It produces a logical structure of wage rates, and a better balanced wage schedule between all companies. Collective bargaining on wage rates sees to it that all elements of wage determination are considered—job differences, levels of skill, and local and area factors that have a bearing on wages.

It brings along with it another important factor in the wage picture — acceptance of the results. I won't say that everybody is satisfied with each bargain, or that he thinks he is paid as much as he is worth. You don't think so; neither do I. In fact, nobody does. But when the union and company jointly agree to a wage schedule for a fixed period of time, that settlement is more acceptable than if the company determined wages by itself.

I know many superintendents who prefer this method of determining wages to former systems where the superintendent set them himself (or at least got blamed for setting them).

2. With high wages and a logical rate structure, the industry is attracting a high degree of intelligence and skill among its workers. We know that the members of the Paper Makers Union have a high capacity for responsibility and leadership, and it goes without saying that these same men who are an asset to our union are also an asset to the company.

3. Aggressive representation of the workers in the paper industry provides a spur to efficient management. The Paper Makers are determined that the company which is not willing to keep its plant in shape is not going to get a subsidy from its workers in the form of low wages. We know from experience that the good companies can pay good wages. We have long since learned that it is not the wage rate by itself that decides labor costs; it is how much a man produces for that hourly wage. Aggressive, militant drives to force wages up have compelled management to install new equipment and improved processes to stay in business.

4. Unions have made some improvements in the ranks of supervision, too. I am not speaking now only of those members of the Paper Makers Union who have worked their way to high supervisory positions in the industry, although we are very proud of these men and the contribution they are making to sound labor relations. I am speaking also of the emphasis unions have given to selection of supervisors who can treat fairly with workers as well as do a good technical job. With day-to-day collective bargaining a reality, the irresponsible, tyrannical supervisor, who considered himself king of all he surveyed, is becoming a thing of the past.

5. This leads into my fifth point. Management in organized mills has an excellent line of communication to and from its employes. It is a simple matter to find out what its workers are thinking, what they want. It is not necessary for the company to use stool pigeons to find out; the union committee will tell them, officially and in much greater detail.

This line of communication reaches down to each and every employe in the plant. Suppose the company wants to introduce some changes in a department that will realign jobs. It has a potential ally in making these changes, provided that it consults the union committee so that transfers, seniority adjustments, and job content are worked out well in advance.

The importance of bringing in all interested parties and explaining the objectives to them cannot be overemphasized. Even the Army, which must depend on authority, has seen the value of this. In the old days the platoon sergeant would be ordered to take a certain hill and that was all there was to it. It is not surprising that some of the doughboys were less than enthusiastic about their assignment.

The new method is to bring in platoon sergeants for "briefing" and give them maps of the hill and the surrounding terrain. It is explained why this position is vital and how it fits into the over-all plan. Experience has shown that the new method is 100 percent more effective. What applies to platoon sergeants applies with equal force to shop stewards and union committees.

But what about some of the more material benefits, particularly to the superintendents — benefits more direct and immediate? Some theorists in economics have put forth an idea that material goods should be provided to the wealthy, with the expectation that some of these goods will "trickle down" into the hands of wage earners. We operate on a reverse theory—that benefits should be obtained by wage earners and these benefits will find their way, by capillary action perhaps, up into supervision.

We know that as our wage levels rise, your salaries will rise also—that as we get more vacations and holidays, you will too. Lately, there has been much emphasis on pension and weltare plans, and we hope that capillary action works there, too.

So far, I've been talking about the good side of the picture, as far as unionism in our industry is concerned, but it isn't all sugar and honey. We, in the labor movement, are not above criticism, certainly, and we get our share of it in the public prints. No doubt you are familiar with these criticisms of unions, so I'd like to get off my chest some viewpoints about management.

As good as our union-management relations have been, we still have an employer here and there in the paper industry who insists that one of his missions in life is to be a father to his employes, and papa knows more than they themselves know what is best for them. The company official, be he president or superintendent, who practices such paternalism is headed for eventual trouble. Only a few weeks ago, we won bargaining rights in a paper mill as a result of an organizing campaign which had been in progress off and on for some 17 years. All the pent up resentment, silently suppressed over the years, has now been released, and we have our hands full trying to avoid an explosion.

Even our friends in the industry — and by friends I mean those who deal with their employes fairly and in good faith — sometimes try to trade on our reputation for responsible unionism by seeking an unfair advantage of their workers and our members. Our reluctance to use the strike weapon except as a last resort is well known, but we are determined that this reluctance shall not be carried to the point where we fail to get a fair and just settlement of any differences which may arise.

The Paper Makers is a responsible union. We honor our contracts, and we use all honorable means to settle our differences. But, we have been forced by some few companies to use extremely militant methods in settling grievances, and in driving a hard bargain when one is called for in negotiations.

We are spending many thousands of dollars each year in training programs designed to teach officers and shop stewards to do a business-like job in our relations with management. Our members are taught to keep their dealings on a high plane, with emphasis on honesty and integrity.

What are you doing about the supervisors under you? Many, many times a man elevated to a position of supervisory authority develops a fanatical attitude toward management, an attitude which is in most cases contrary to over-all company policy.

Some foremen, and some superintendents, believe the entire future welfare of the company depends upon their holding the union within their own concept of restraint. A superintendent who lays awake nights, thinking of ways to increase production, cut costs, and improve efficiency, will not

spend a moment of time in studying the treatment of men as human beings. He is blissfully confident he knows it all, and there is nothing left for him to learn.

Many supervisors never take the trouble to ascertain the real labor relations policy of the company, and never make a complete and detailed study of the labor contract and the proper interpretation of its various provisions. Nor do they study government laws and regulations which affect labor relations in their plant.

Although it is not as prevalent as it once was, we still find an occasional supervisor who lets his personal feelings influence his attitude in his dealings with the employes under him, individually and collectively. By "personal feelings," I mean the full range of human emotions.

I have often wondered why management does not inaugurate and carry through a continuing program of training for the supervisory staff in the art of harmonious labor relations. The unions have shown that such a program will work; and we have repeatedly offered the employers advice along these lines, just as I am doing now. But, such advice is usually ignored, as most free advice is—which is the reason the Paper Makers are still in business and I still have a job. In view of this, our task—yours and mine—is to continue to do the best we can to work together for the good of all who are in the paper industry.

I am convinced sound labor relations are the rule, rather than the exception, in the paper industry; but the job will never be complete. Labor-management relations in our industry have often been cited as a model for others to copy. Let us not get so close to the trees that we can't see the forests. At any rate, we should not puff out our chests and congratulate ourselves too much on what we've done in the past.

Our economy is progressive. Either we progress with it, or we fall by the wayside. The fact that we have a proud past does not mean that we can meet the needs of the future with the same set of tools. What meets today's needs may not be good enough tomorrow.

The United States is striving at the present time to exert leadership throughout the world. Many of the countries we are seeking to win to our side are watching carefully what happens here in this country. In a real sense, we are living in a showcase, with both an Eastern and a Western exposure. Our enemies and our friends alike are quick to point out our faults.

What has this to do with collective bargaining? It has a lot to do with it. The success or failure of collective bargaining, in my opinion, will determine in large measure how influential we can be with the people of both Europe and Asia. We must be able to show them a record of continuous progress by free trade unions in our economic system. If we fail in this fundamental job, our claims to leadership will fade.

Both management and labor, therefore, must apply to our day-to-day problems all the energies and skills we possess. If our capitalistic system is to survive, we must have both truly free enterprise and real industrial democracy. Our whole industrial system is operating in a sort of goldfish bowl. The system is on trial before the court of public opinion of the peoples of the world. Their decision will be based upon what we do, and not upon what we say. The Paper Makers pledge our full support to the end that this decision will be a favorable one. We pledge to you and to all our fellow countrymen, complete cooperation in promoting the industrial and political leadership of America, with the hope that the results of our efforts will be an inspiration to all the nations of the world.

Presented before the Annual Convention of The American Pulp and Paper Mill Superintendents Assn., at Detroit, Mich.

R. F. Merwin and R. C. Hoff

of Eriez Manufacturing Co. discuss same

Tramp Iron Problem in Paper Industry*

Returns from a questionnaire recently received from 178 key operating and engineering personnel in the paper industry reveal that tramp iron has contributed to a costly shutdown in the experience of exactly 50% of those surveyed. In addition to loss of income due to shutdowns, it was definitely established that foreign metals is costing the paper industry several million dollars a year additional as the result of damage to chippers, hogs, valves and pumps, beaters, pulpers, Jordans, refiners, Fourdriniers.

On examination, a typical collection of tramp iron causing this damage consists of wedges, spikes, links of chain conveyor flights, wires, tie buckles, nails, bolts, pipe nipples, tools, pieces of welding rod, bottle caps, large pieces of scale and small wire staples. One box board mill actually removed a Ford engine block from its beater.

The tramp iron problem is more critical today than it was 20 years ago, due to the fact that such vast progress has been made in the replacement of men by automatic conveying and process machinery. This means that more stray metal is entering process lines as a result of less manual inspection. Furthermore, as we use more mechanized equipment, *more* steel conveyor and machinery parts and fastenings inevitably break or wear away, and the survey reveals these parts frequently reach a vulnerable piece of equipment.

Unfortunately there is no *single* answer to this rather complex problem. In some operations riffle boxes, settling tanks and Vortraps, etc., can be utilized to greatly reduce the foreign contamination. This paper deals solely with the most serious and costly of the foreign material problems—mainly tramp iron, and the use of magnetic separators as a solution to the problem.

While magnets do not attract the non-ferrous metals such as brass, copper and aluminum, it is generally conceded that of foreign metal problems in processing plants, only 1% to 2% of tramp metals are non-magnetic—and because these are usually softer metals, they do not cause the damage to vulnerable processing equipment that the harder steels do.

Only the more progressive of the design engineers have recognized the seriousness of the problem caused by the increasing amount of tramp iron traveling in processing lines, and are designing adequate magnetic protection into the original plans. However, an increasing number of plants are realizing real savings by providing tramp iron protection for chippers, pumps, defibrators, mills and Fourdriniers. Coal burning power plants have long recognized how much dam-

age a railroad spike in the coal can cause to conveyors, stokers and pulverizers, and use magnetic protection, but only 41% of those replying to the questionnaire stated they were using magnetic separators in pulp and paper lines. And a large percentage of those mills without magnets stated tramp iron contributed to shutdowns.

Properly designed and positioned magnetic separators can solve virtually every serious tramp iron problem that exists in paper processing today. In fact, 68% of those reporting on the effectiveness of their magnetic separators stated they were operating at an efficiency of 90% or better. This is a remarkable figure in view of the fact that many magents of inadequate strength and capacity have been installed without serious consideration having been given to all mapor factors which contributed toward maximum effectiveness. In the paper industry these major factors include volume and velocity of material flow, density and consistency of material, physical limitations, and in the case of closed systems, the pressure involved at point of installation.

In theory, the remedy for a tramp iron problem in the paper industry is relatively simple. Tramp iron causes trouble; magnet catches tramp iron; install magnet and eliminate trouble.

In practice, however, the solution can be complicated by many conditions, that effect the efficiency with which ferrous contamination can be removed from wood chips or paper slurry. For example, a magnetic pulley installed at the end of a belt conveyor traveling 125 feet per minute and carrying a four inch burden of wood chips, will probably never permit a piece of tramp iron to pass. However, if that belt is traveling at 400 feet per minute with a six inch burden depth of wood chips, the same pulley would likely be less than 75% effective. In the latter case, the horizontal momentum is too great for the magnet to always remove the iron. The problem becomes more difficult when it is desirable to remove a magnetic object the size of a tack from a five per cent paper slurry traveling under pressure. Factors such as volume and velocity of slurry, size of iron to be separated, desirability of automatic cleaning, all form part of the equation used to determine the type and strength separator required.

This leads to an obvious conclusion —it is highly desirable to procure the recommendations of a magnetic separation specialist in the solution of specific requrements for a paper processing application. Magnetic separators are not something that can be purchased "off the shelf" in the paper industry.

Prior to 1945, all magnets installed in the paper industry were electrically energized; however, since the development of Alnico, a powerful new magnetic alloy which holds its magnetic strength indefinitely, today more than two-thirds of the magnetic separator installations in the paper industry incorporate permanent magnets. Not only can permanent magnetic separators be tailored to fit specific applications, but also they do not need motor generator sets or rectifiers, electrical wiring, require no outside source of power to energize, and never weaken or burn out as do electro units when subject to wet conditions in the paper industry.

Basically, magnetic separators can be divided into four specific categories.

1. Magnetic Pulley—This device automatically separates tramp iron from non-magnetic materials such as wood chips and coal conveyed on belts. As contaminated material reaches the pulley, a powerful magnetic field which penetrates both the belt and the bed of material attracts and holds to the belt all undesirable iron and steel. The clean product, being non-magnetic, falls off the pulley at the natural tangent point.

The magnetic tramp iron is held to the belt until carried past a divider and out of the magnetic field. It then drops into a bin, chute or whatever is desired. The pulley will work efficiently with belts of rubber, canvas or other non-magnetic materials.

2. Magnetic Drum—A separator that is similar in principle to the magnetic pulley is the magnetic drum. It can be installed in any conveying system that does not use belts and automatically removes ferrous contamination from both wet or dry materials, depending on where and how it is installed.

The magnetic drum separator consists of a revolving stainless steel cylindrical shell within which a stationary, high-powered, non-electric magnet is located. In the case of paper slurry, the material flows against the stationary magnetic field and ferrous particles adhere to the shell's surface. As the shell revolves, it carries the magnetic material up out of the flow where the contamination is automatically removed by means of a scraper.

3. Plate Type Magnets—Many hundreds of permanent plate type magnets are installed in strategic locations in paper processing operations. The most common non-electric industrial magnetic separator consists of a series of Alnico magnet castings mounted on magnetic stainless steel plates. These are surrounded by strips of non-magnetic stainless steel which prevent the leakage of magnetic lines of force to surrounding iron or steel. The better designed plates incorporate a protective stainless steel cover to protect magnet castings from tampering by workmen and from unwanted accumulation. Frequently they are completely submerged in the slurry and will effectively remove tramp iron under water without loss of magnetic strength for indefinite periods of time. (The FBI and State Police utilize the same piece of equipment to retrieve murder weapons at the bottom of a lake or river.

4. Magnetic Humps or Traps—The paper industry has demanded and has had built for it magnetic humps and traps —packaged units built to withstand pressures, incorporating powerful liquid tight magnetic plates. Properly installed, these devices are virtually eliminating serious tramp iron damage to pumps, jordans and refiners, and saving users hundreds of dollars per year not only in machinery damage, but down time.

Since to date it has ben impractical to incorporate a self-cleaning magnetic self-cleaning separator which will operate under pressure, magnetic humps, traps and plates must be opened and tramp iron manually removed. A by-pass line can be incorporated when it is necessary to clean without shutting down the line.

One New York state mill, after installing two magnetic humps (which are cleaned once a week) estimated the savings in damage to machinery at over $50,000 per year. Incorporated in this figure is not only lost production and the man hours involved in the repair, but the cost of fillers which were being constantly damaged in their Jordans.

All four types of equipment can be built with adequate physical and magnetic capacity to solve even difficult tramp iron problems.

Many mills have incorporated non-electric magnetic humps in the pressure line immediately ahead of Jordans and refiners. Plate type magnets in head boxes are saving many mills hundreds of dollars a year in the elimination of machinery damage, and at the same time slightly improving quality of the finished paper. In addition to tramp iron, magnets usually remove a percentage of the rust scale and fine iron contamination that flows in processing lines.

Let us visualize what happens when a typical piece of tramp iron is permitted to pass freely through pulp and paper processes, and briefly discuss what is available today in the way of protection for processing machinery.

Two spikes, a short one and a heavy one, are embedded in a log traveling on a conveyor into the barker. As the bark is removed, the shorter spike is freed and eventually travels with other stray iron to the bark hog.

Because of the amount of tramp iron in bark, protection for bark hogs is usually provided by means of the self-cleaning magnetic head pulleys at the discharge ends of the belt conveyors feeding them. If bark hogs are fed by drag link conveyors, frequently the bark can discharge onto powerful plate type magnets which remove spikes, conveyor parts, tools, etc., permitting only clean bark to fall into the hogs. Of the dollar volume of damage caused by tramp iron, our survey

reveals that 6.8% is being suffered by hogs.

Meanwhile, the long spike has remained in the log which is chewed up by the chipper. Unfortunately, the longer spike was cut into several pieces by the heavy blades of the chipper. These blades now badly nicked by the spike will require replacement, perhaps immediately, as they will not produce the clean chips desired.

The seriousness of the tramp iron damage to chippers is revealed by the fact that questionnaire returns showed at 25.4% of the industry's annual tramp iron damage occurs at this point. To protect saws and chippers, a few lumber and paper mills have installed electronic metal detectors to detect the presence of larger metal embedded in logs. Rapidly moving saws can snap from striking embedded metal, and in a few instances flying blades have caused serious and even fatal injuries to nearby workmen. In most cases, however, the installation and operating difficulties and high cost of not only the metal detector, but of handling logs after metal is detected, has been a deterring factor in the installation of metallic protection devices at this point. The only comment relative to metal detectors on the questionnaire returns was from a northwest pulp mill which reported their metal detector installation "50% effective."

In analyzing the great amount of damage tramp iron does to chippers, it is the opinion of many operators that metal embedded in logs causes less than 30% of the total damage. The remainder comes from loose tramp iron such as links of chain, pieces of steel plate, conveyor flights, which could conceivably be arrested by plate type magnets properly recessed in the steep chute leading to the hog. One South Carolina mill was the victim of an acetylene cylinder, looking much like a log, going into their chipper with a resultant shutdown and repair bill of several thousand dollars.

But let us go back to the several pieces of heavy spike as they travel along in the wood chips on the conveyor belt toward the storage bins, and eventually to the digesters. If belt speed is not excessive, here is an ideal point to remove the troublesome tramp iron before it enters the digesters by means of a suspended magnet or magnetic pulley at the end of the chip conveyor. As a general rule of thumb, if the belt speed on a 24" diameter pulley exceeds 250 feet per minute, a magnetic pulley will not be 100 percent effective as it will be when traveling at lower speeds. The largest permanent magnetic pulley built today is a 30" diameter x 96" belt width Eriez unit which was installed in January 1952 by International Paper Company in Panama City, Florida to remove tramp iron from wood chips.

If belt speeds prohibit the use of a magnetic pulley, plate magnets in down spouts are frequently used for removing iron at this point.

But let us assume tramp iron enters the digester and then is ejected into a blow pit or diffuser. A close clearance pump next lifts the slurry to the knotters. Some of the spike may pass the pump but any one piece may put it out of commission. One unsolicited comment on the survey reads, "Tramp iron has plugged our stock pumps quite often, causing loss of production." Replacement of valves and pumps accounts for 14.4 percent of the paper industry's annual tramp iron bill.

Damage to pumps, knotters, etc., is being prevented by the installation of well-positioned plate magnets at the outlet of the blow pit or diffuser pit. Magnetic plates installed at the discharge of screens and chests can also eliminate damaging iron. While there is no device that will automatically remove large quantities of tramp iron in a pressure system, a non-magnetic slurry drum has been developed which will effectively and automatically remove an extremely large percentage of ferrous contamination in open systems.

In one New England boxboard plant, a permanent magnetic slurry drum, which cost less than one thousand dollars, is removing 200 lbs. of staples, chips, nails, etc. per day from a slurry of between three and four percent consistency.

While tramp iron is recognized as a serious problem by practically all pulp, boxboard and straw mills, this problem also rears its ugly head in the lines of converters. Many are plagued not only with the wires that bind their bundles and laps, but by accidental entry of tramp iron within their own operation. Bottle caps, Crescent wrenches, nuts and bolts, and pipe nipples are only a few of the typical pieces of metal being removed daily by magnetic separators from lines of converters throughout North America. In fact, on the paper industry's annual tramp iron damage bill, 29.2 percent of it is a result of necessary repairs and replacement parts to beaters, pulpers, Jordans and refiners.

Many mills have incorporated non-electric magnetic humps in a pressure line, immediately ahead of Jordans and refiners. One Northwest pulp mill superintendent commented, "Tramp iron wrecked our Hydrafiner three months ago. Approximate repair cost five thousand dollars."

Possibly one of the most surprising results of our survey is the fact that even the Fourdrinier is a victim of stray iron, as paper mill operators and engineers report that 12.3 percent of the damage done by tramp iron occurs to the screens and rolls of this machine. Even though the speed of the screen is approximately 1500 feet per minute, it is economically feasible for those suffering tramp iron damage to the Fourdrinier to install a powerful permanent magnet approximately ¾ of an inch above the screen, to remove the most damaging pieces of tramp iron.

Recognizing that the amount of tramp iron is constantly increasing, it behooves progressive mills to analyze the maintenance, repair and operating budget to determine whether or not tramp iron is a major culprit. Many mills have found a few well placed magnetic separators greatly alleviate the costly tramp iron problem, and considerable savings will accrue year after year through reduction of machinery damage and down time. It behooves everyone concerned with the future to call attention to any new equipment and ideas that will help keep his company competitive regardless of economic conditions.

* Presented before the 33rd Annual Convention of The American Pulp and Paper Mill Superintendents Assn., Sheraton-Cadillac Hotel, Detroit, Mich.

Change Administration of Kimberly Fellowship Program

The Kimberly-Clark Foundation, Inc., received its first project as Kimberly-Clark Corp. turned over to it the fellowship program which was started in 1946. The fellowship program, which involves grants to students doing graduate work, will remain the same as it has in the past except that from now on it will be supported by the Kimberly-Clark Foundation.

Fellowships will be awarded this year under the Foundation for graduate study in chemical engineering at Massachusetts Institute of Technology, in economics at Notre Dame University, in forestry at the University of Minnesota, and in chemical engineering at the University of Wisconsin. The Foundation also will continue Kimberly-Clark's contributions to the scholarship fund at the Institute of Paper Chemistry.

The Foundation grants fellowships on the recommendations of a committee made up of H. A. Rothchild, assistant to the vice-president in charge of manufacturing, R. W. Lyons, vice-president and director of the Kimberly-Clark Corp.; and W. H. Swanson, assistant vice-president and director of the Research and Development Department. Mr. Rothchild is chairman of the committee. Follow-up work on the fellowships will be handled by James Shipman, superintendent of process development, for chemical engineering; J. B. Millar, chief forester, and Lyons for forestry; W. H. Clifford, director and vice-president in charge of finance, for economics.

Although the Foundation will keep in touch with the progress of studies made under its grants, selection of the students who receive the fellowships and the specific subject for graduate study is determined by the schools involved, and findings that result are available to all interested persons.

The student is placed under no obligation as to employment as a result of the grant, nor is there any obligation to the student on the part of Kimberly-Clark, or the Foundation.

HE COULDN'T control foam, but YOU CAN

Years ago, King Canute the Great commanded the incoming tide to halt. But the sea advanced steadily, in lines of foaming breakers, until frothy, bubble-laden water lapped around the royal chair—forcing the royal occupant eventually to leave the beach.

Canute lost his battle with foam, but there's no reason why you should lose yours. Nopco* defoamers are at your disposal, affording "bubble busters" capable of eliminating obstinate foam conditions *within a matter of minutes.*

We particularly draw your attention to Nopco KFS. This remarkable foam killer provides an effective means of control *at every stage* in pulp and paper making where foam has to be "knocked down." Its lightning-fast action is of great advantage whenever foam tends to build up suddenly—as when induced by a surge of exceptionally foamy stock.

You'll find that KFS will do a real job of foam elimination, no matter how great the volume or speed of your production.

Write for our free bulletin, "Nopco KF* Series Dispersing Agents"; it gives valuable tips on how to improve sheet formation and suggestions for making stock emulsions. And remember, our specialists are always ready to assist you with technical aid right in your mill.

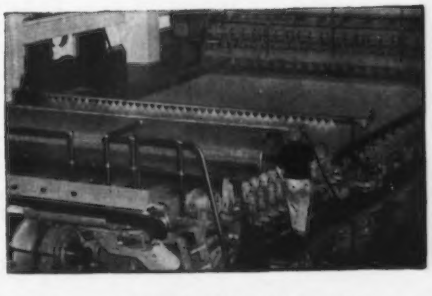
Foam formation is eliminated, and surface tension of water in stock greatly reduced, by spraying a dilution of 1/10 of 1% KFS through a battery of mist-type nozzles installed across the wire.

NOPCO TRADEMARK EVOLVED THRU RESEARCH

NOPCO CHEMICAL COMPANY

HARRISON, NEW JERSEY

Branches: Boston • Chicago • Cedartown, Ga. • Richmond, Calif.



LOOK TO NOPCO AS YOUR SOURCE OF SUPPLY FOR: *Foam Killers • Sulfated Oils • Emulsified Resins • Coating Compounds • Wax Emulsions and Emulsifiers • Rewetting Agents • Insoluble Metallic Soap Dispersions • Sheet Formation Aids • Plasticizers • High Free Rosin Sizes • Pitch Dispersants*

S. I. Aronovsky

Northern Regional Research Laboratory,[1] Peoria, Ill., tells why

The American Paper Industry Needs Straw and Bagasse*

Quite a lot of interest has developed in the last few years in the United States on the possibilities of cereal grain straws and sugarcane bagasse for the manufacture of pulp and paper. This interest in fibrous annual crop materials has been spurred largely by the increased production and consumption of pulp and paper products and by the higher cost of suitable pulpwoods. The increase in production from 23 million tons in 1949 to nearly 27 million tons in 1951 represents a per capita increase in consumption of nearly 50 pounds of pulp, paper, and board products in this 2-year period. This is an astounding increase, when viewed in the light of the world's annual consumption of fibrous cellulosic products averaging only about 20 pounds per capita. Assuming that about half of the increased production is virgin pulp and that the yield of pulp based on wood is 50 per cent, it is readily seen that the average annual increase in pulpwood consumption between 1949 and 1951 was about two million tons. According to recent information, new mills being built and projected will consume an additional six million tons of pulpwood putting an additional strain on the already tight status of pulpwood cut and grown.

As all of you know, the cost of pulpwood has increased considerably in the past few years, particularly in the Middle West and in the northeastern areas. Pulpwood supplies have receded farther and farther from the mills, resulting in larger transportation costs. The cost of woods labor has increased. Taken together, the increasing demand for paper and board products, the greater cost and, in some areas, decreasing supplies of pulpwood are causing many American pulp and paper manufacturers to look rather closely at other available fibrous raw materials.

[1] One of the Laboratories of the Bureau of Agricultural and Industrial Chemistry, Agricultural Research Administration, U. S. Department of Agriculture.

A.P.W.

ONLIWON

INDUSTRIAL
TOWELS
TISSUE

Fibrous Agricultural Residues

Practically all plant materials that have a fibrous structure are potential sources of cellulose for the paper and cellulose derivative industries. These materials include straws, stalks, reeds, grasses, hulls, and so on. Only a relatively few of these types of materials are suitable for commercial cellulose production, however, from the overall standpoint of availability, cost, and quality of the fibrous product. The most suitable of the materials available in quantity are the cereal grain straws and the stalks of the sugarcane, corn, soybean, and cotton plants. The average amounts of these residues produced annually in the United States and its possessions for the years 1935 to 1951 are shown in *Table I*. You can see from the figures that the fibrous crop residues constitute a cellulose reserve of no mean proportion. The figures represent the total annual production of the crop residues and cannot be considered as available in such amounts for industrial use. However, if we assume that only 30 per cent of the residue materials can be made available for commercial utilization, and if we further assume a cellulose pulp yield of 30 per cent (this is much lower than we can actually obtain) we would still be able to meet the cellulose requirements of this country from these crop residues, alone, without using any wood pulp.

Stalks

We all know, however, that practically and economically it is impossible to use all of these crop residue materials. Cornstalks, which are available in larger amounts than the residues from any other single crop in this country and from which excellent papermaking fiber can be produced, are not likely to be used for the commercial production of pulp until methods for economical collection of the stalks and for their preservation in storage have been worked out. The recently extended use of the mechani-

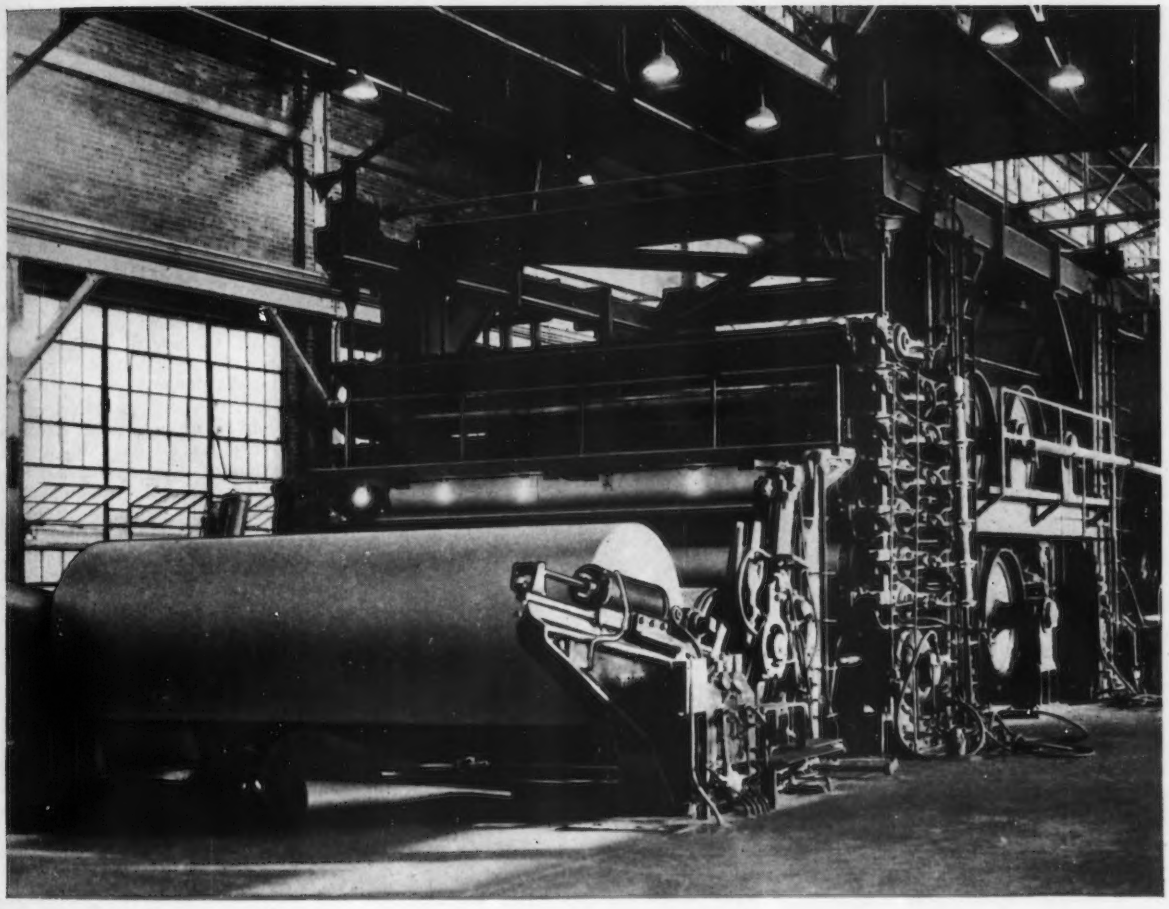
TABLE I.—ANNUAL PRODUCTION OF FIBROUS AGRICULTURAL RESIDUES FOR 1935-51, INCLUSIVE[1]

Residues	Production of Dry Residue		
	Average 1935-46	Average 1947-50	1951[2]
	1,000 Tons		
Wheat straw	61,515	83,603	68,134
Rye straw	3,373	1,830	1,857
Oats straw	30,567	34,727	33,700
Barley straw	10,276	10,248	9,168
Flax straw	2,040	3,758	2,839
Rice straw	1,949	2,458	1,478
Total straws	109,720	136,624	117,176
Corn stover	80,331	98,461	98,852
Soybean stems and pods	4,283	8,333	10,098
Cotton stems and pods	15,887	11,414	13,998
Bagasse fiber, continental U. S.	744	807	700
Bagasse fiber, insular U. S.	2,704	2,212	2,300
Total other fibrous products	103,949	121,218	125,928
Grand total	213,669	257,842	243,404

[1] U. S. Department of Agriculture, Agricultural Statistics, 1948-51.

[2] U. S. Department of Agriculture, Bureau of Agricultural Economic Crop Report Board, Annual Summary, Acreage, Yield, and Production of Principal Crops, 1951.

This Modern Oil Cuts Costs!



Builders and operators of paper-making machinery have made an important discovery.

They are recognizing the value of detergent type oils for the circulatory lubricating systems of dryer rolls —*and* they are turning to such oils as Sinclair RUBILENE® H. D. for maximum lubricating effectiveness and minimum cost.

Sinclair RUBILENE H. D. is a *highly* refined lubricating oil with *added* ingredients to give high level detergent-dispersant properties. It *reduces* failure of both plain and anti-friction bearings because it resists oxidation . . . protects against formation of carbon or varnish . . . won't sludge or foam . . . and *cleans* as it lubricates!

ACT NOW to find out more about RUBILENE H. D. and how it can help reduce maintenance costs and sustain production in your mill. Contact your local Sinclair Representative or write Sinclair Refining Company, 600 Fifth Avenue, New York 20, N. Y.

SINCLAIR RUBILENE

FOR LOW MAINTENANCE COSTS

cal picker for harvesting corn has made the problem of collecting cornstalks still more difficult because the mechanical picker breaks the stalks and knocks them to the ground. Any method of picking up these broken stalks would involve inclusion of a considerable amount of dirt.

Soybean and cotton stalks suffer from a similar lack of economical methods of collection and of preservation in storage. The main portion of these stalks consists of woody material with fibers of relatively short length. The sheath, or bast fibers of the soybean stalk, contains fairly long papermaking fibers, but the amount is so small that it adds little strength to the weak, short fibers of the woody portion of the stalk. With cotton stalks, on the other hand, pulp produced from the whole stalk has strength qualities equal or superior to those of pulp made from wheat straw or sugarcane bagasse. However, as I have already pointed out, soybean and cotton stalks will not be considered as suitable raw material for the paper industry until practical and economical methods for collecting and preserving the stalks have been worked out.

Bagasse

Sugarcane bagasse presents a more favorable picture. It is found concentrated at sugar mills, as a byproduct of cane sugar manufacture. Since the sugar-grinding season is only 3 to 4 months in continental United States, and about 5 to 10 months in Puerto Rico and Hawaii, it is evident that a portion of the bagasse for use in pulp and paper manufacture will have to be stored and preserved during storage. Although only about 700,000 tons of bagasse is available in continental United States, the fact that it is concentrated at sugar mills creates no collection problem, and makes it attractive as a raw material for the pulp and paper industry.

Straws

Next to the stalks of the various agricultural plants, the cereal grain straws represent the largest amount of available fibrous raw material. Wheat straw is the most aboundant and most widely distributed of these straws, being produced in amounts second only to cornstalks. Oats produces the next largest amount of straw, followed in turn by barley, rye, and rice, in the order of decreasing quantities.

The oats and barley straws are not as desirable or as suitable as wheat straw for paper pulp. These straws, containing considerably more leafy materials and chaff, characteristics which make them desirable for feeding purposes, produce weaker paper pulp than is generally obtained from wheat straw. Because oats and barley straws are better feeding materials, they are used almost entirely on farms —particularly dairy farms. Rye straw has been reported to be as good or better than wheat straw for pulp and paper, but as can be seen from *Table I*, the production is relatively small and even this amount is scattered over a rather large area, making collection somewhat difficult. Rice straw, although concentrated in four states, Louisiana, Arkansas, Texas, and California, is also produced in relatively small amounts. Besides, rice straw has an extremely high ash content, 14 to 18 per cent, composed mainly of silica, and it tends to deteriorate rapidly during storage in exposed ricks or stacks. Paper pulp produced from rice straw is relatively weak when compared with pulp from wheat or rye straw.

Although seed flax straw has been included with the cereal grain straws, it is actually in a class by itself, since it contains two main types of fibrous materials—tow fibers and woody shives. Flax straw has found but little use as whole straw in the pulp and paper industry. The tow fiber, largely separated from the shives in a decorticating plant, is used mainly in the manufacture of cigarette and other high-grade, light-weight, thin, strong papers. Since the tow fiber represents only about 20 percent of the total straw, you can readily see that it is a rather costly raw material for ordinary paper manufacture.

TABLE II.—PRODUCTION AND AVAILABILITY OF WHEAT STRAW IN 1951 [1]

State	Wheat Straw	
	Production	Available [2]
	1,000 Tons	
Ohio	2,401	600
Indiana	1,647	412
Illinois	2,337	584
Michigan	2,156	539
Minnesota	1,402	350
Total, North Central wheat belt	9,943	2,485
North Dakota	10,568	2,641
South Dakota	4,006	1,002
Nebraska	4,065	1,016
Kansas	8,828	2,207
Total, Great Plains wheat belt	27,467	6,866
Oklahoma	2,723	681
Texas	1,211	303
Total, Southwest wheat belt	3,934	984
Montana	6,859	1,715
Idaho	2,658	664
Colorado	2,448	612
Washington	5,261	1,315
Oregon	2,030	508
Total, Mountain and Pacific wheat belts	19,256	4,814
Total, wheat belts	60,600	15,149
Grand Total, U. S.	68,134	17,034

[1] U. S. Department of Agriculture, Bureau of Agricultural Economic Crop Report Board, Annual Summary, Acreage, Yield, and Production of Principal Crops, 1951.

[2] Estimated, 25 per cent of production.

Wheat Straw

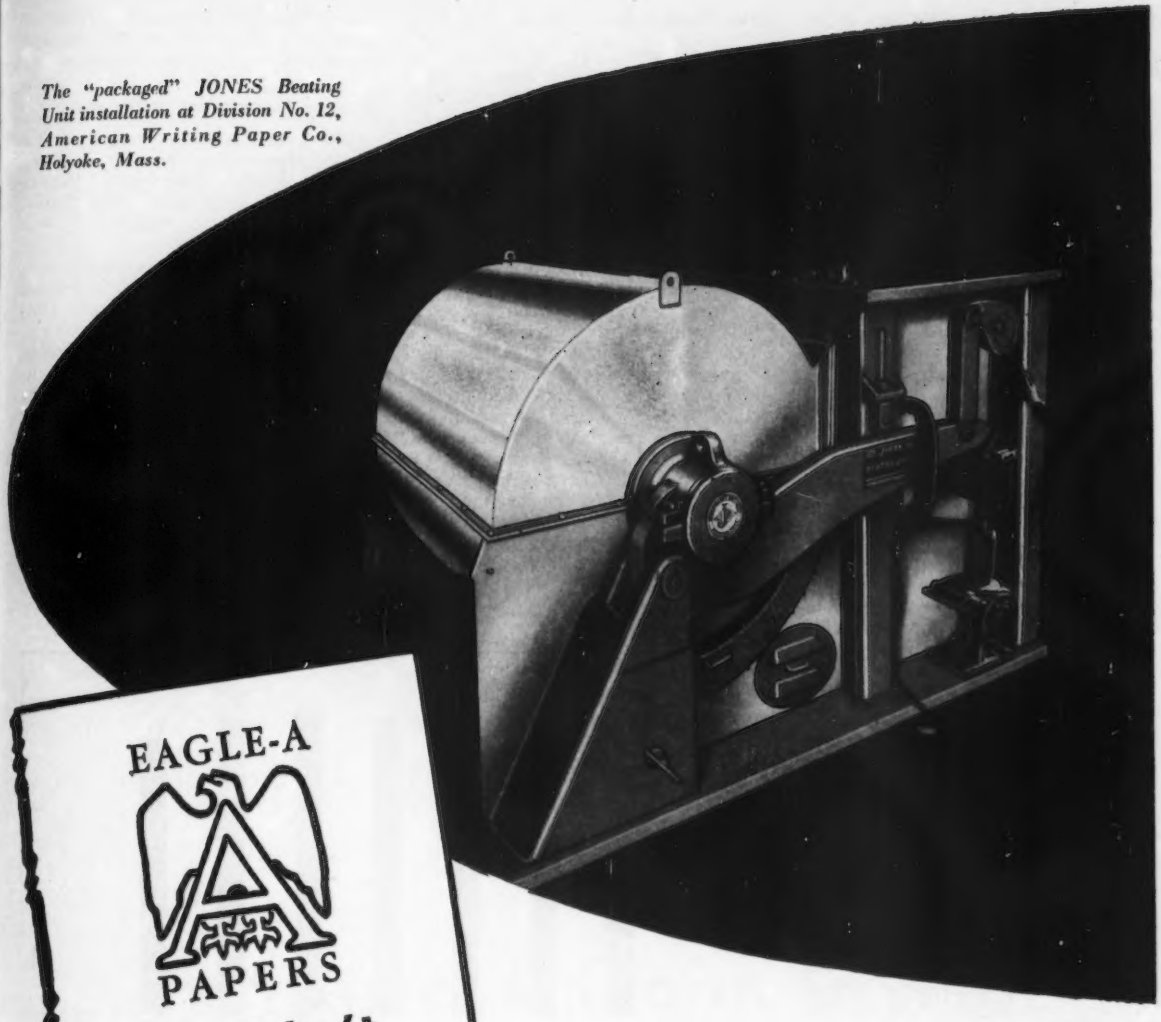
As I have said previously, wheat straw is grown not only in great abundance in this country but it is concentrated in four wheat belts, comprising about 16 states which cover the North Central area and a large portion of the area west of the Mississippi River. These four wheat belts account for about 60 million of the 68 million tons of wheat straw produced in the United States, in 1951, as shown in *Table II*. The Great Plains area, comprising North and South Dakota, Nebraska, and Kansas, accounts for more than 27 million tons of straw—nearly half of that produced in the four wheat belts. Even if only 25 per cent of the straw produced were available to industry—and it has been estimated that more straw than that has been burned on farms annually—it is readily evident that the wheat belt areas have sufficient available straw to support a number of good-sized pulp mills. In the North Central or Corn Belt area, with the strawboard industry using about 400,000 tons a year, and race tracks, railroads, and other users accounting for a similar amount, there is still available more than 1,500,000 tons of wheat straw which can be picked up and used for pulp, paper, or other purposes.

The large bulk of available wheat straw, about 7 million tons, is found in the Great Plains area. Only a very small portion of this straw, and that mainly from Nebraska, is sold and used for industrial purposes. Surveys by state organizations in Kansas, Nebraska, and Colorado have shown at least two locations in each state where there is plenty of water, power, labor, and straw to support a 100-ton per day pulp mill. With the increasing availability of industrial water in North and South Dakota through the building of dams and reservoirs, those two states should be a good source of wheat straw for pulp in the not too distant future. The Southwest and Mountain and Pacific wheat belt areas should be particularly attractive to the pulp and paper industry because the wheat in these areas is grown on very large farms, involving in some cases many thousands of acres to a farm, thus simplifying collection of the straw.

Straw Collection

Considerable progress has been made in recent years in the gathering and baling of combined straw. Balers which produce straw bales with a density of about 10 pounds per cubic foot and which automatically pick up the straw, bale it, and tie it with wire are available. They require the services of only one man to drive the small tractor which pulls the baler. These balers can be readily equipped with a mower attachment, so that the stubble can be cut, baled, and tied in a single operation. There seems to be nothing in-

The "packaged" JONES Beating Unit installation at Division No. 12, American Writing Paper Co., Holyoke, Mass.



EAGLE-A PAPERS couldn't be better

but the JONES BEATING UNIT helps keep their quality high and cuts power costs 50%!

American Writing Paper reports this Jones Pre-assembled Beating Unit has turned in an amazing performance, maintaining uniform high quality and the physical characteristics of their all-rag stocks . . . with a saving in power consumption of 50% over previous equipment.

Backed by the engineering skill and experience that produced the Jones-Bertrams Patent Beater, this new unit incorporates the best features of that machine . . . but with better control, more positive and uniform treatment of stock, and greater economy of power.

And because it is delivered completely *pre-assembled* it is as simple to install as a Jordan . . . with consequent savings in installation cost, floor space, floor load and maintenance.

Available for tub installation or in a Multi-beater set-up for continuous operation. Ask your Jones representative or write us direct for details.

E. D. Jones

E. D. Jones and Sons Company, Pittsfield, Mass.

BUILDERS OF QUALITY STOCK PREPARATION MACHINERY

herently difficult in collecting straw in this manner, and this procedure is already being used by some suppliers of straw to the strawboard mills and by some of the mills themselves. I was out on the West Coast a few years ago and saw a demonstration of wood cutting and handling on one of the large tree farms run by a lumber and pulp and paper manufacturer. After seeing the marvelous, efficient engineering feats involved in handling and hauling the huge logs of wood, it appears rather surprising to me that people who look on such operations as ordinary, commonplace, and easy should consider the procurement and handling of straw a difficult problem. All the problems involved in straw procurement are not solved as yet, but the methods now used are practical and economical, and further improvements are expected with increased mechanical handling of the straw and with improved machinery for doing so.

Some of you have probably heard in the last year or two that the strawboard mills have had some difficulty in obtaining the required amount of straw for their operations. That is true, but the main reason was not lack of straw, but rather indifference or disinterest of the farmer in selling his straw at the prevailing prices. We may be wrong in our diagnosis and treatment of this problem, but we believe that it requires education of both farmer and mill management. The farmer needs to be shown that his straw is required not only in periods of shortage, but every year and that he is receiving a reasonable price for his material and labor. Mill management, on the other hand, should treat the straw procurement problem in the same manner that it handles the procurement of farmlot wood or some of the other raw materials; it should contract for the material in advance and assure the supplier that he will get a reasonable profit on his material and operations. If this is done, we believe that the industries using straw will have no particular difficulty in obtaining all the straw they need, and thus eliminate the "feast and famine" cycle that has prevailed in the past few years.

Straw should be collected at harvest time, generally July and August. Therefore, the year's supply of straw has to be collected, baled, and stored during a one- or two-month period. The best time to collect the straw is immediately after harvesting the grain which can be done only when the ground is fairly dry and the grain is dry. The straw is also relatively dry and free from weeds at this time, and in excellent condition for baling. The bales eventually are built up into ricks of approximately 400-500 tons each in accordance with underwriter requirements. Storage is either at the mill site or in the country. These ricks are roughly 65′ long, 50′ wide, and 30′ high, and the tops may be either flat or pyramidal.

Straw Preservation in Storage

Preservation of the relatively dry baled straw in ricks is now a fairly simple and inexpensive matter through use of a procedure developed cooperatively by the Northern Regional Research Laboratory and the strawboard industry. About 500 pounds of crude borax (borascu) is spread on the upper surface of the next to top tier of bales and 1500 pounds more is spread over the top tier. The borax effectively prevents microbial deterioration when the straw is wetted by rain; the difficulty soluble borax saturates any rain water which penetrates the bales and prevents the growth of bacteria, molds, and fungi which normally are present on the straw. So far as we know, there are no practical and economical methods of preserving straw that has been baled wet. Tarpaulins, treated paper, and portable sheet-metal roofs have been tried as coverings for straw ricks, but such methods of preserving straw, while more or less satisfactory, are more expensive than the simple dusting of borax on the top bales. Borax has no deleterious effect on either the straw or on the strength properties of the pulp produced.

Bagasse Preservation in Storage

The preservation of sugarcane bagasse presents a different problem from that of wheat straw. Bagasse constitutes, along with wheat straw, the agricultural raw materials of most immediate importance to the pulp and paper industry. As bagasse comes from the sugar mill rolls, it contains about 50 per cent moisture and about 2 per cent sugar—two conditions providing a fertile field for microbial activity. A preservation method developed a number of years ago by a well-known manufacturer of insulating board resulted in reducing the storage losses due to microbial action to about 10 per cent of the weight of bagasse. In this method the wet bagasse as it comes from the sugar mill rolls is baled, and the bales are stored in a definite pattern in ricks of about 500 tons, dry basis. Because of the sugar and high moisture content of the ba-

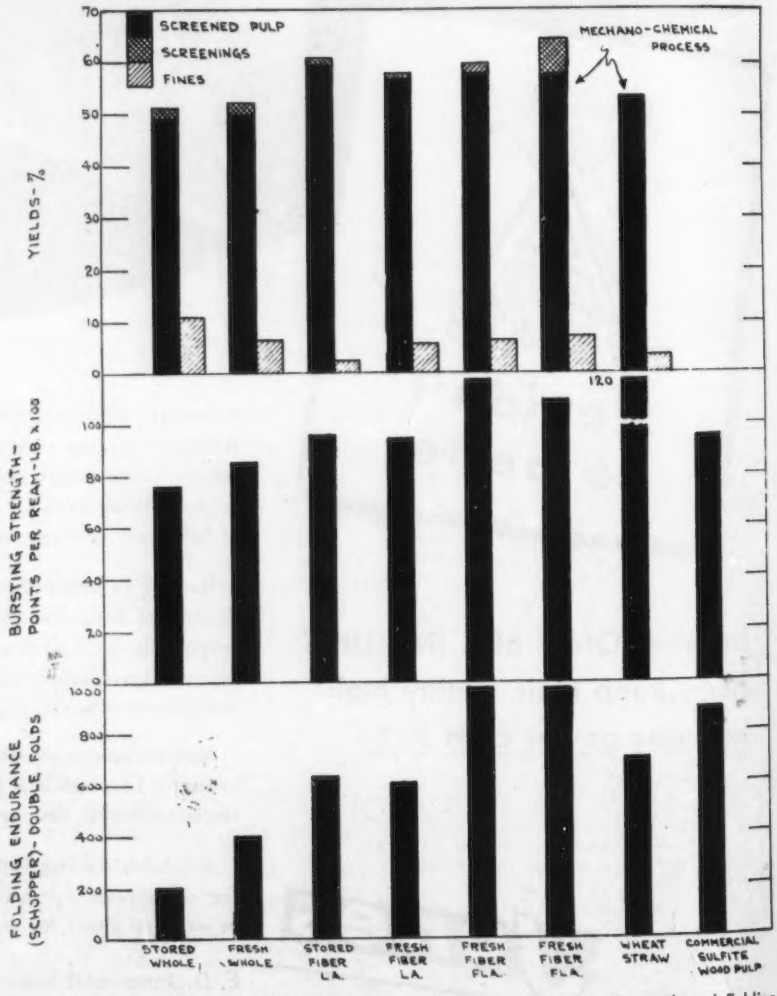


Figure 1—Yields of Screened Pulp, Screenings, and Fines, and Bursting Strength and Folding Endurance of Bagasse Pulps for Fine Papers.

WILLIAM L. BARRELL CO.
BOSTON, MASS.

SIAMESE

For Faster Uniform Drying

WILLIAM L. BARRELL
COMPANY

52 CHAUNCY ST., • BOSTON, MASS.

• *Siamese and Tour Boss Dryer Felts* •

gasse, the ever-present fungal and bacterial organisms begin at once to ferment the sugar and soluble carbohydrates to alcohol and to acetic and other acids. These fermentations are strongly exothermic and raise the temperature of the bagasse in the ricks or piles. At the same time, the carbon dioxide and other gases produced by fermentation become saturated with moisture as they leave the ricks. This combination of increased temperature and evolution of gaseous products results in a fairly rapid decrease of moisture in the bagasse to a point where it will no longer support further microbial action. The tiers of bales in the outside portion of the ricks exposed to rain and weathering are terraced slightly as the ricks are built up, and microbial action on these exposed surfaces is retarded by placing boric acid or borax at the junctures of the various tiers of bales. The top of the rick is protected by a removable roof made of sheet-metal plates which overlap slightly.

The loss of material which, as I pointed out earlier amounts to about 10 per cent of the bagasse, is borne mainly by the carbohydrate portions which are attacked first by the fermentative action of the microorganisms and later by the hydrolytic action of the acids produced. Compared with original bagasse, therefore, the stored bagasse contains less carbohydrate material and more lignin. There is no evidence that the microbial action on the carbohydrate in this method of storing and preservation is limited to the pithy portion of the bagasse, or even that the carbohydrates of pith are attacked preferentially. As a result the bagasse stored under these conditions retains most of its pith.

Depithed Bagasse

In a novel scheme recently developed at the Northern Regional Laboratory, the pith is separated from the bagasse fiber at the sugar mill by a wet process. The separated pith and fiber are each mechanically dehydrated and heat-dried. The dried pith which contains but little fiber is highly absorbent and can be mixed with blackstrap molasses to serve as a base for feed. The dried fiber can be baled and sold to pulp and paper mills. The cost of separating the pith from the fiber would be borne by the pith fraction which would now have a monetary value, in feed, considerably above that of the original bagasse; and the dried, depithed bagasse fiber could be furnished to the pulp mills at a cost pretty much in line with the present cost of stored whole bagasse. Such dried fiber would offer no storage or preservation problems.

Pulping Straw and Bagasse

It has been demonstrated at the Northern Laboratory and elsewhere that the acid pulping processes are not suitable for straw, bagasse, or the other agricultural residues. The pulps produced by the acid processes make relatively weak and brittle paper and board products. Two-stage processes, such as the nitric acid process and the prehydrolysis procedure, where the second stage consists of an alkaline cook, will produce satisfactory pulp from these residues, but the yields will be very low. The practical value of such two-stage procedures for annual crop residues is still doubtful and their economic value is unfavorable at present for producing paper pulp.

Since all of you are more or less familiar with the production of a crude pulp from straw and bagasse for the manufacture of corrugating paper, I shall not discuss that type of pulp further and shall confine my remarks to the use of these agricultural materials for the stronger and finer grades of papers and board.

The conventional soda, kraft, and monosulfite processes produce satisfactory pulps from straw, bagasse, and other annual residues, with the more alkaline processes giving stronger pulps and the monosulfite process producing larger pulp yields. The choice of chemicals will depend to a large extent on the type of pulp desired and, in some cases, on equipment and conditions in the individual mills where these materials are to be pulped.

The troublesome node problem en-

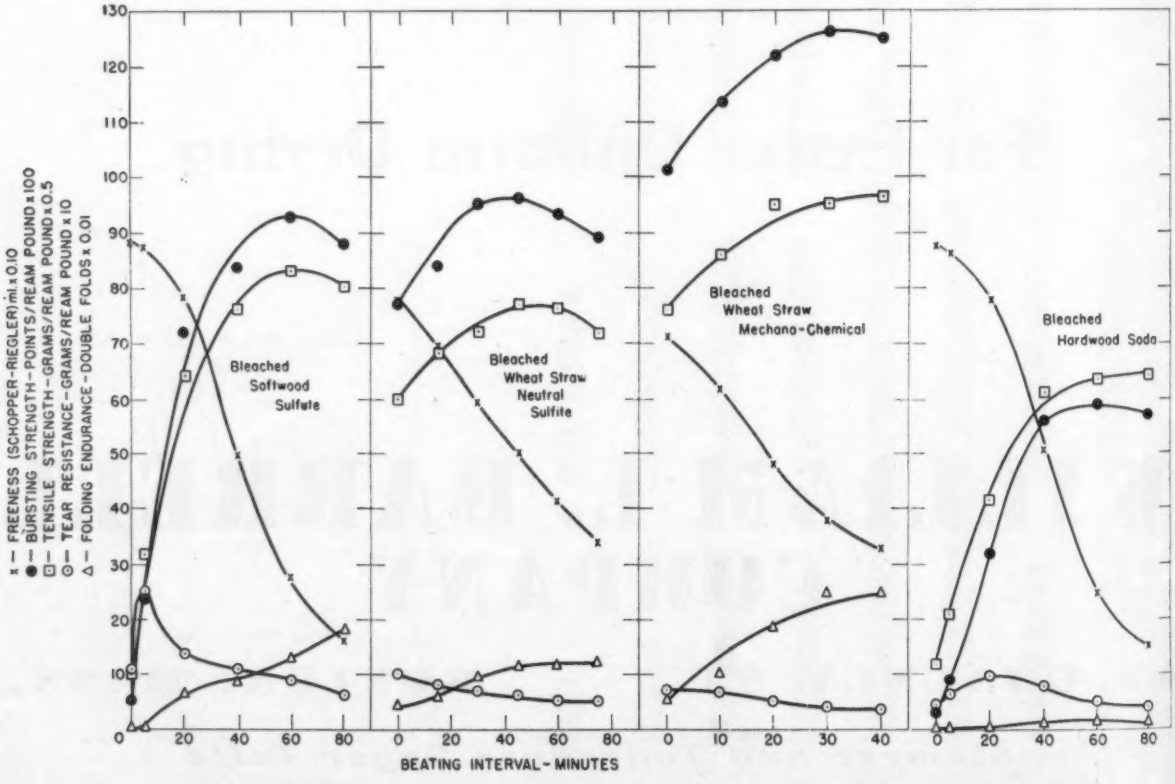

x — FREENESS (SCHOPPER-RIEGLER) ml x 0.10
● — BURSTING STRENGTH - POINTS/REAM POUND x 100
□ — TENSILE STRENGTH - GRAMS/REAM POUND x 0.5
⊙ — TEAR RESISTANCE - GRAMS/REAM POUND x 10
△ — FOLDING ENDURANCE - DOUBLE FOLDS x 0.01
Bleached Softwood Sulfate
Bleached Wheat Straw Neutral Sulfite
Bleached Wheat Straw Mechano-Chemical
Bleached Hardwood Soda
BEATING INTERVAL - MINUTES

FIGURE 2.--COMPARATIVE STRENGTH PROPERTIES OF BLEACHED WHEAT STRAW AND COMMERCIAL WOOD PULPS

MORDEN *SLUSH-MAKER*

The controllable bar-to-bar action of the "Slush-Maker's" rotor and bed plate (shown enlarged at right) is the answer to rapid, efficient and complete pulping and deflaking of all pulps and paper stocks—even high wet strength.

The circulating action of the rotor blades quickly blends and mixes various pulps along with color, size and other additions to the furnish.

The bar-to-bar action may be set up to give a preliminary beating treatment to the stock or to brush the color and size into the fibers.

The "Slush-Maker" completely prepares the stock for final fiber treatment in "Stock-Makers" or other beating and refining equipment.

We are prepared to run a "Slush-Maker" demonstration for you—let us know your pulping requirements.

SLUSH-MAKER

MORDEN
Machines Company

STOCK-MAKER

CORBETT BUILDING
PORTLAND 4, OREGON

countered in European and South American straw pulping practice is eliminated by "blowing" the charge from the digester at the end of the cooking period. The nodes, rachises or heads, and seed kernels explode, as they leave the digester, into their ultimate particles which are mostly platelets, spirals, and straight and serrated cells small enough to go through an 80-mesh or 100-mesh wire. These platelets and cells can be largely eliminated from the pulp after the screening operation, by running the accepted pulp from the screen over a suitable hillside screen or decker wire. The pulp from which these fine platelets and cells have been removed is freer and stronger than the European and South American straw pulps and approaches closely the freeness and strength of wood pulps.

In bagasse the nodes contain fibers sufficiently large to be considered as papermaking material. Bagasse pith, however, consists largely of fine platelets and cells. When whole bagasse is pulped, these platelets and cells can be removed from the pulp, as in the case with wheat straw, by running the screened pulp over a hillside screen or decker wire. With whole bagasse containing approximately 25 per cent pith, this results in lowering considerably the yield of usable paper pulp from this material. Furthermore, the pith particles not only tend to give a "slow" pulp but they also render bleaching more difficult and are a main source of specks and dirt. It seems ridiculous, therefore, from an operating and economic standpoint, to pulp whole bagasse for fine paper pulp. Depithing the bagasse prior to cooking eliminates most of the difficulties resulting from the presence of an excessive amount of pith, and gives larger yields of stronger pulp than can be obtained from whole bagasse, as indicated in *Figure 1*.

The soda and kraft processes yield about 45 per cent of unbleached, screened (8-cut) pulp from straw, about 47 per cent from whole bagasse, and about 60 per cent from depithed bagasse, when the conventional pressure pulping procedures are used, with a cooking time of 2 hours at the maximum temperature of 170° C. (100 p.s.i.). With the monosulfite process, wheat straw gives a yield of 53-55 per cent of unbleached screened pulp, and depithed bagasse fiber about 56-58 per cent. The chemical requirements are half or less than half of those necessary to produce fine pulps from hardwoods or softwoods.

As already stated, the soda and kraft pulps produced from agricultural residues are stronger than the monosulfite pulp. The bursting and tensile strengths and folding endurance of the monosulfite straw or bagasse pulps are in the same range as those of sulfite softwood pulps, as shown in *Figure 2*. The strength characteristics of the soda and kraft straw or bagasse pulps are better than those of softwood sulfite pulps and approach those of the softwood kraft pulps. Because of the smaller average fiber length of tear resistance of the straw and bagasse pulps is, of course, lower than that of the coniferous wood pulps. The monosulfite straw and bagasse pulps contain 3-5 per cent lignin and require 5-7 per cent total chlorine to reach a brightness of about 70, while the alkaline pulps contain 5-6 per cent lignin and require 7-9 per cent chlorine to reach the same brightness.

Mechano-Chemical Pulping

The new mechano-chemical process developed at the Northern Laboratory recently is particularly suitable for the production of strong and easy bleaching pulp from straw or bagasse. In this process, the agricultural residue material is cooked at atmospheric pressure and about 98° C. (208° F.) for 30-45 minutes with the same amount of alkali chemical, based on dry raw material, required in cooking for 2 hours at 170° C. The yields of screened pulp from this process are generally 6-10 per cent higher than those obtained in the conventional pressure cooking method and the pulps are fully equal in strength characteristics and bleachability to the conventional pressure-cooked pulps. The cooking is carried out in a Hydrapulper, Fibre-Pulper, or similar equipment, which provides the necessary auxiliary mechanical action required in this pulping process.

TABLE III.—DATA ON PAPERS CONTAINING BLEACHED STRAW PULP

	Pulp Furnish					Stock			Sheet Properties															
							Head Box Freeness																	
Machine run, No.	Bleached straw soda, %	Unbleached groundwood, %	Bleached sulfite, %	Waste news, %	Bleached soda, %	Jordaning press. (gage), lb.	Schopper-Riegler, cc.	Canadian Standard, cc.	Basis weight 25x40—500, lb.	Thickness, mils.	Density, gm. per cc.	Bursting strength, pts./lb./rm.	Average tearing resistance, gm. per lb. per rm.	Average tensile strength, p.i.w.	Average folding endurance, double folds	Air resistance (Gurley), sec./100 cc.	Smoothness (BEKK), sec.	Brightness, G.E. equiv.	Gloss, %	Opacity, %	Castor oil penetration, sec.	Size No.	Ash content, %
									Magazine Coating Base Paper 32-Pound Basis Weight (25 x 38—500) [1]														
3473	..	60	40	..	..	5	...	...	33.1	2.5	0.73	0.24	0.77	6.8	3	22	44.4	68.9	..	..	..	...	5.5
3474	25	60	15	..	..	5	305	140	32.8	2.7	.67	.33	.64	9.4	8	47	15.5	67.8	..	..	..	...	6.4
									Newsprint Paper 32-Pound Basis Weight (24 x 36—500) [2]														
3475	..	..	20	80	..	0	470	185	37.2	2.8	.73	.25	.73	8.5	5	27	34.2	61.1	40	89	39	0.40	1.8
3476	20	..	..	80	..	0	405	145	37.8	3.0	.71	.26	.61	10.4	7	56	20.3	61.9	36	88	69	.28	2.6
									Soda Book Paper 50-Pound Basis Weight (25 x 38—500) [3]														
3477	..	..	50	..	50	12	625	280	53.0	3.1	.95	.17	.63	8.7	1	49	81.4	81.1	34	92	49	.93	17.2
3478	30	..	20	..	50	0	575	230	50.1	2.8	.99	.23	.70	10.2	3	76	109.2	81.5	36	91	65	1.08	16.5
									Bond Paper 20-Pound Basis Weight (17 x 22—500) [4]														
3479	..	..	100	..	..	0	675	345	54.2	3.7	.81	.30	1.17	14.4	12	23	14.6	79.5	28	86	58	.93	7.4
3480	60	..	40	..	..	0	410	145	54.6	3.4	.89	.51	.83	20.9	55	199	8.1	81.0	28	83	203	1.43	8.4
									Bleached Waxing Paper 30-Pound Basis Weight (24 x 36—500) [5]														
3481	..	..	100	..	..	0	585	285	34.8	2.1	.92	.46	.75	13.8	24	28	36.9	...	34	69	35	.82	...
3482	50	..	50	..	..	0	535	200	35.1	2.2	.87	.62	.67	17.5	131	88	24.2	..	35	64	59	1.18	...
									Greaseproof Paper 30-Pound Basis Weight (25 x 40—500)														
3486	75	..	25	..	..	0	110	...	29.5	1.7	.96	.81	.38	18.4	2854	+7320	...	...	..	..	+1800 (Turpentine)	...	...

[1] Furnishes include 7.0 percent Whitex clay. [2] Furnishes include 3.0 percent Whitex clay and 0.25 percent rosin size. [3] Furnishes include 25 percent Whitex clay and 2 percent rosin size. [4] Furnishes include 10 percent Whitex clay and 1.5 percent rosin size. [5] Furnishes include 1 percent rosin size.

Burn REFUSE or COAL *With* DETROIT STOKERS

Successful Installations Burn

Hogged Wet or Dry Bark
Hogged Wood
Wood Shavings and Sawdust
Wood Sander Dust
Spent Tan Bark
Corn Cobs
Coffee Refuse
Oat Hulls
Coconut Shells
Tobacco Stems
Leather Scraps
Peanut Shell Refuse

—Either separately or in combination with coal, oil or gas

The use of the Detroit RotoStoker and RotoGrate Stoker for various kinds of waste materials, followed quite naturally its established use for burning an extremely wide range of Coals, as well as high moisture Lignite.

Through the years, installations with steam boilers of a wide range of types and sizes have been made for burning waste materials.

If you have combustible refuse, the best disposal method is *burning it* which will avoid nuisance or pollution and at the same time will salvage the fuel value.

Detroit RotoStokers and Detroit RotoGrate Stokers are readily adapted and highly successful for refuse burning.

Write for this 24 page Booklet 505 which gives Engineering data on our refuse burning installations.

SINCE 1898

DETROIT STOKER COMPANY

General Motors Building • Detroit 2, Michigan
District Offices in Principal Cities • Works at Monroe, Mich.

The nodes are also eliminated from the mechano-chemical straw pulp but in a different way than in pressure-cooked pulp. In mechano-chemical pulping the very short cooking period is insufficient to do more than merely swell and soften the nodes, heads, and seed kernels in the straw. These materials, freed from the cooked straw stems in this process, are larger and heavier than the straw fibers and they are easily separated from the acceptable straw fibers by the simple well-known processes of riffling and screening. The straw nodes, heads, and seed particles which are the main sources of specks and shiners in the present European and South American commercial straw pulps are thus easily eliminated from the mechano-chemical straw pulps.

Many pulp and paper men from all over the world, as well as from this country, have visited the Northern Laboratory in the past 2 years to observe demonstrations of the mechano-chemical process on straw and on sugarcane bagasse. All, without exception, were astounded at the pulping efficiency and utter simplicity of this process. They were intrigued by the idea of being able to obtain a uniform pulp from cook to cook, as samples can be scoooped out easily for observation and the pulping action stopped immediately at will. This process is suitable for use only with the more alkaline chemicals, such as caustic soda, the kraft chemicals, or lime. It cannot be used with sodium sulfite satisfactorily since this chemical requires a higher temperature than can be obtained in an open vessel at atmospheric pressure. Also, this process is practically applicable only to those materials of the grass family which have a more or less open physical structure. Because of the dense structure of wood, or of woody materials, such as flax shives, hemp hurds, cottonstalks, or soybean stalks, the mechano-chemical process is not suitable for pulping these materials.

Characteristics of Straw and Bagasse Fibers

In physical dimensions the ultimate straw and bagasse fibers have an average length of about 1.5 millimeters and an average width or diameter of about 15 microns. The average length of coniferous wood fibers is about 3.0 millimeters and their average width is about 40 microns; on the other hand, deciduous hardwood fibers have about the same length as straw and bagasse fibers, but the same diameter as the coniferous wood fibers. Thus, the ratio of length-to-diameter of straw and bagasse fibers is about one-third greater than that of coniferous wood fibers, and two to three times as great as the ratio for deciduous wood fibers. The straw and bagasse fibers generally have pointed ends and they are not readily fibrillated in beating or jordaning. Because of their high length-to-diameter ratio and because they are not fibrillated, the straw and bagasse fibers tend to produce a better formed, smoother and more compact sheet than is generally made from the larger and thicker fabrillated wood fibers. It was therefore expected, and as I will show later was actually the case, that the addition of straw or bagasse fiber to wood pulp produced papers with smoother surfaces and more uniform formation.

Chemically, straw and bagasse fibers have the same constituents, cellulose and hemicelluloses, as do the wood fibers, but the proportions of these constituents in the two types of materials are quite different. While wood pulp generally contains 80-90 per cent alpha-cellulose and 5-15 per cent hemicelluloses, the straw and bagasse pulp have only 65-75 per cent alpha-cellulose and the hemicellulose content consisting almost entirely of xylan, varies from about 20 to 33 per cent. The higher yields of the monosulfite and mechano-chemical straw and bagasse pulps are due mainly to retention in these pulps of larger proportions of the hemicelluloses. Starting with straw or bagasse containing 26-28 per cent pentosans, the monosulfite pulps will contain 28-30 per cent and the mechano-chemical pulps up to 33 per cent pentosans. It is thus evident that the mechano-chemical process approaches the ideal in pulping methods, namely, delignification with a minimum of attack on the carbohydrate constituents of the raw material.

As stated previously, the agricultural residue fibers are not readily fibrillated in beating or refining. Because of the high hemicellulose content of the straw and bagasse pulps they tend to hydrate and swell more easily and quickly than is the case with wood pulps. Therefore, they require less power than is necessary with wood pulp to attain the same degree of beating or refining. Fibers which can swell rapidly on wetting also tend to shrink considerably on drying. This property of the straw, bagasse, and other agricultural residue fibers, in addition to their high length-to-diameter ratios results in a large number of fiber-to-fiber bonds in a relatively small area of the paper web, and thus accounts for the high strength developed by the relatively short fibers.

Blending Pulps

We are all aware that the tendency of the paper industry throughout the world, and particularly in the United States, is toward the manufacture of specialty papers and paper products, i.e., papers designed to do a certain job and to do that job better than paper manufactured to serve several different purposes. To make such specialty papers, experience has shown that much better results can generally be obtained by blending two or more pulps than by using only a single type of pulp as the whole fiber furnish. Each of the fibers used in the blends should be capable of contributing to the paper the property or properties that could not be obtained so easily or so well from the other fibers in the furnish. You are all familiar with the use of coniferous kraft and sulfite pulps for high tear resistance and tensile strength and of groundwood and hardwood pulps for good formation, smoothness, softness, and opacity. At the Northern Laboratory we firmly believe in and advocate taking advantage of the particular and peculiar properties of the individual fibers in producing paper and board with the optimum desired properties. For example, in blending wood sulfite with straw pulp we beat the sulfite pulp only for a few minutes to arrive at the maximum tear

TABLE IV.—PROPERTIES OF KRAFT BAG PAPERS CONTAINING STRAW PULP

	Pulps		Stock			Sheet Properties						
	Pulp Furnish			Head Box Freeness								
Machine run, No.	Unbleached straw pulp, %	Unbleached sulfate pulp, %	Jordaning pressure, lb.	Schopper-Riegler, cc.	Canadian Standard, cc.	Basis weight 25x40—500, lb.	Thickness, mils.	Density, gm. per cc.	Bursting strength, pts. per lb. per rm.	Average tearing resistance, gm. per lb. per rm.	Average tensile strength, p.i.w.	Average folding endurance, double folds
3484 [1]	..	100	15	750	480	50.4	3.7	0.75	0.60	1.41	22.2	128
3485 [2]	25	75	10	670	345	50.5	3.5	0.80	0.76	1.22	26.5	224

[1] Furnish includes 1.5% rosin size. [2] Furnish includes 1.5% rosin size on kraft portion and 1% on straw portion.

for superior whiteness

HELMERCO* BLUE

for blues and greens

QUINOZOL BLUE BP DUSTLESS

HELMERCO BLUE has long been a standard for producing superior whiteness in bond, writing, book and ledger papers. HELMERCO BLUE combines good working properties with excellent light-fastness.

QUINOZOL BLUE BP DUSTLESS is especially recommended for the production of blues and greens for bond, book and cover papers. It is an acid blue of excellent solubility and level dyeing properties, and assures good light-fastness and a minimum of two-sidedness. Just ask your Calco representative for full information.

*Trade-mark

Calco

AMERICAN Cyanamid COMPANY

CALCO CHEMICAL DIVISION, DYESTUFF DEPARTMENT
BOUND BROOK, NEW JERSEY

NEW YORK • CHICAGO • BOSTON • PHILADELPHIA • CHARLOTTE • PROVIDENCE

REPRESENTED IN CANADA BY
NORTH AMERICAN CYANAMID LIMITED, CALCO CHEMICAL DIVISION
MONTREAL—TORONTO

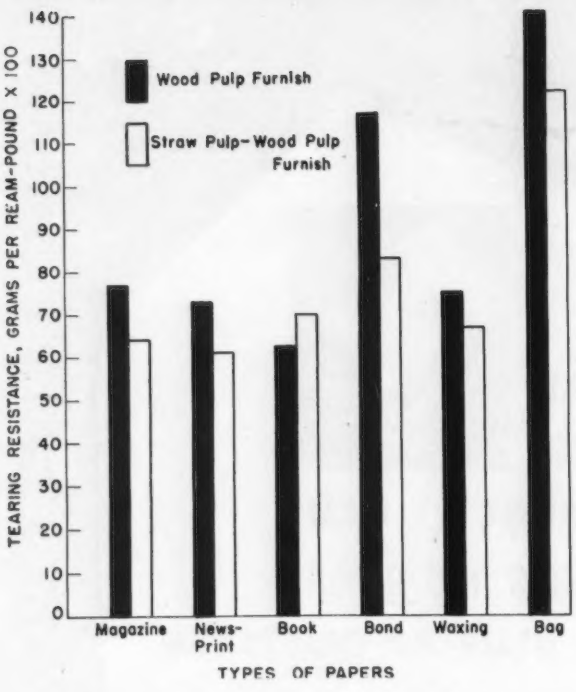


Figure 3—Tearing Resistance of Experimental Papers.

resistance of that pulp. Then we beat the straw pulp to the point where a blend of the two pulps had the desired freeness. Handsheets made of this blend had higher bursting and tensile strength and folding endurance and higher tear resistance than could be obtained from either of the two pulps individually when they were each beaten to obtain their highest average strength values. Reports on the commercial blending of straw and wood pulps in Europe and South America, and of kraft and eucalyptus pulps in Australia, corroborate our Laboratory findings. Australian practice in producing a wrapping paper, is to beat the softwood kraft pulp only to its maximum tear, and then blend this pulp with an equal amount of the short-fibered, higher hemicellulose, eucalyptus pulp which has been beaten to obtain maximum bursting and tensile values. The wrapping paper produced from a blend of these two pulps is claimed to be as good as the sheet made from 100-per cent imported softwood kraft pulp.

In connection with blending pulps I would like to remark briefly on a matter which has given us some concern recently. In the last couple of years most of you have read in the technical, as well as in the lay press about plans to build large pulp and paper mills to produce newsprint and other papers from furnishes of 100-per cent straw or bagasse pulps. These plans or schemes, coming as they do in times of apparent or actual shortage of pulp and paper, all tend to create interest and some enthusiasm on their possibilities. Your own experience and business and financial sense, however, will tell you that such plans or schemes are not practical for this country. It is, of course, possible that in some lands, where wood pulp and pulpwoods are not available locally and must be imported, papers from 100-per cent straw or bagasse pulps may find a market, but in North America and other lands with pulpwood and wood pulp supplies it would be neither economical nor desirable to manufacture paper from all-straw or all-bagasse pulp furnishes. Such papers could find only very limited use or application in this country; furthermore, since both the straw and bagasse pulps are chemical pulps, it is not conceivable that they could compete in cost with groundwood pulp in the foreseeable future. Proposals for such mills should, therefore, be examined very closely and cautiously.

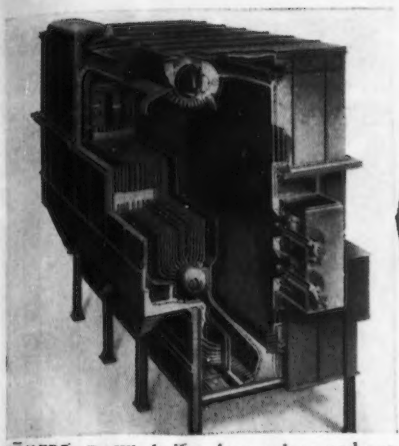
Paper Trials

Last year, in cooperation with the Forest Products Laboratory at Madison, Wis., we made various types of papers on their experimental 13-inch Fourdrinier paper machine from blends of wood pulps with straw and bagasse pulps. The wood pulps were commercial products from the Lake States area and the straw and bagasse pulps were prepared at the Northern Laboratory by the mechano-chemical process from Illinois soft winter wheat straw and depithed Louisiana bagasse. The residue pulps were bleached in the pilot-plant equipment of the Forest Products Laboratory. The following types of papers were made from straw pulp-wood pulp blends, using all-wood pulp furnishes as controls: Groundwood magazine coating base; newsprint filled book; bond; waxing; greaseproof; and kraft bag paper. The blended furnishes contained 20.75 percent straw pulp. The data on the strength and papermaking properties of these blends are given in *Tables III* and *IV*, and *Figures 3 to 5*.

It is evident that the addition of straw pulp to the furnishes resulted generally in increased bursting and tensile strength and folding endurance, and in some reduction in tear resistance. The results with the kraft bag paper are particularly interesting. The bursting strength of the straw-containing paper was about 30 per cent higher and the tensile strength about 20 per cent greater than those of the all-wood kraft paper. As the reduction in tearing resistance was only about 15 per cent, the paper still had adequate tearing resistance. The folding endurance of the straw pulpwood pulp blend was nearly double that of the 100-per cent kraft paper.

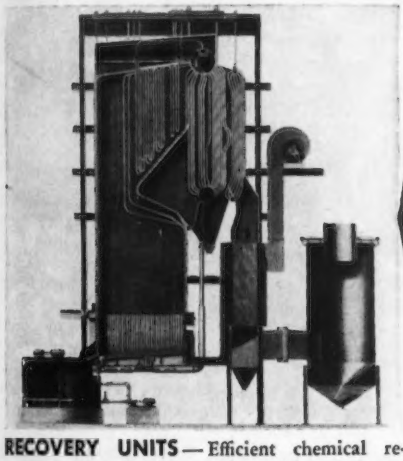
Similar results were obtained later in blending bagasse pulp with wood pulps to produce various types of paper. Newsprint paper produced from furnishes of groundwood with straw pulp and with bagasse pulp was stronger in bursting and tensile strength, somewhat weaker in tearing resistance, and similar in other respects to standard groundwood-sulfite newsprint. The formation of the straw- and bagasse-containing papers, however, was considerably better than that of standard newsprint. The addition of a small amount of bagasse or straw pulp to a high groundwood content furnish resulted in a paper which was considerably stiffer than the all-wood sheet, thus adding a property which is lacking in papers made from some types of wood pulp.

It should not be inferred from what I have said that we consider straw and bagasse pulps as "miracle" products. They have some disadvantages as well as advantages, and are more suitable for incorporation into some types of paper than into others. Because of their relative shortness and high length-to-diameter ratios, they pack more densely and improve formation, but at the same time they produce a more compact and denser sheet. The high hemicellulose content of these fibers, largely responsible for their ease of hydration, is also responsible for lower opacity of the resulting papers. It is evident, however, that the advantages obtained by blending straw and bagasse fibers into paper furnishes far outweigh the disadvantages. Naturally the disadvantages as well as the advantages of various types of fibers govern the choice of these fibers for the furnish of any particular type of specialty paper. It can be stated in general, however, that the addition of straw or bagasse pulp to a paper furnish will improve formation, surface characteristics, strength properties, and stiffness.

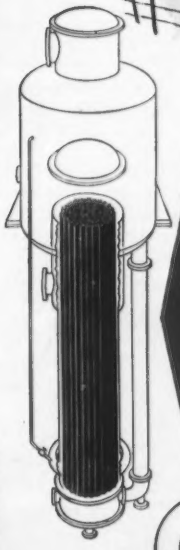


BOILERS—B&W boilers have a long and outstanding record for low-cost steam generation in pulp and paper mills. They span a range of types and sizes to satisfy every requirement of capacity, space, temperature, pressure, fuel, and method of firing. Each type combines the dependability of job-proved design with every economy of standardization commensurate with flexibility.

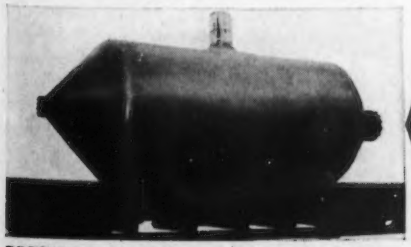
time-proved aids to **LOW COST** production



RECOVERY UNITS—Efficient chemical recovery and reduction, along with maximum steam generation per ton of pulp, are combined with economical operation and maintenance in B&W Recovery Units. Installations for burning waste liquors of the kraft, soda, and bisulphate (magnesium, calcium, and ammonium) processes have a total recovery capacity of over 16,000 tons. B&W recovery units were the first provided with automatic soot blowers to eliminate routine hand lancing.



TUBES—Seamless and Welded steel tubes are made by B&W in a range of carbon, alloy, and stainless steel analyses to satisfy every requirement for condensers, evaporators, heat exchangers, recovery units, boilers, and other paper mill applications. Modern improvements in pulp and paper processes impose a greater variety of tubing requirements than ever before. B&W Tube Representatives offer a wealth of experience on tubing problems to help users determine the analyses best suited for specific operating conditions.



PRESSURE VESSELS—Dependable welded processing units, in sizes and shapes for any paper mill requirements, are fabricated by B&W from carbon, alloy, or clad steels. All vessels are x-ray inspected and stress relieved.

B&W **BABCOCK & WILCOX**

THE BABCOCK & WILCOX COMPANY
85 Liberty St., NEW YORK 6, N. Y.

P-766

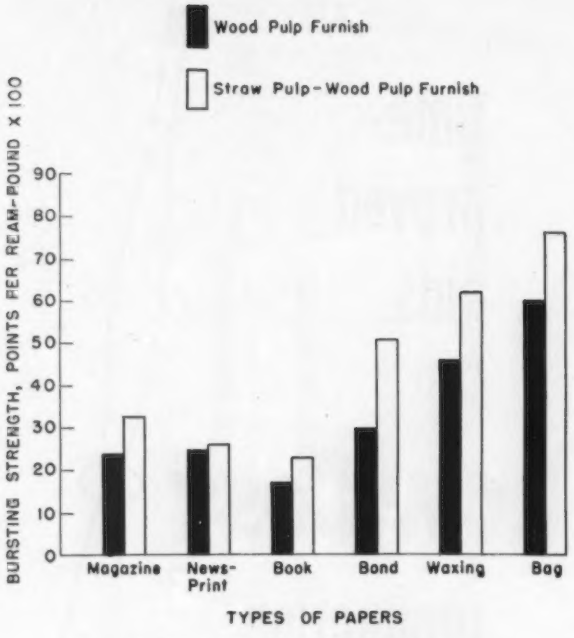


Figure 4—Bursting Strength of Experimental Papers.

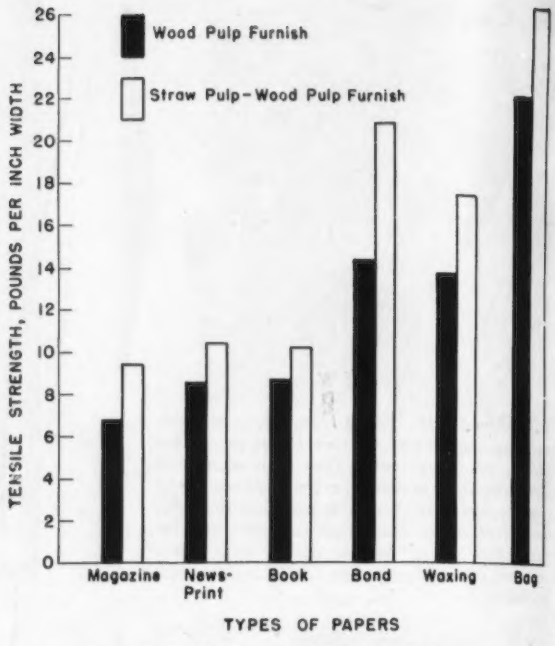


Figure 5—Tensile Strength of Experimental Papers.

Pulp Costs

We have no exact data on the production costs of bleached or unbleached bagasse and straw pulp, since no mills in this country are manufacturing such pulps at the present time. Assuming a cost of $15 per ton for straw or bagasse delivered to the pulp mill, the cost of the raw materials going into 1 ton of bleached pulp, including the raw fiber, and cooking and bleaching chemicals, would be $45 to $50 at present market prices. Assuming further a converting cost from raw materials to the finished pulp, without including administrative overhead and sales, of $25 per ton, the finished pulp would represent a value of $70 to $75 per ton. This figure is relatively low when compared with the present market prices of bleached, chemical wood pulps. Even if the cost of straw or bagasse were increased to $20 per ton the cost of the finished bleached pulp would be only $80 to $85 per ton, still a relatively low figure.

Straw and bagasse pulps can be handled in the paper mills in their present wood pulp equipment, with very little or no modification. In an experimental commercial trial made in a large newsprint mill several years ago straw pulp was processed on screens, wet machines, deckers, and so on with no changes whatsoever required in the equipment or handling of the pulp. Straw pulps may be produced by the pressure-cooking methods in any alkaline pulp mill, with the only required major change in equipment being substitution of a straw cutter or chopper for the wood chipper. For cooking by the mechano-chemical process the only change would be the substitution of a Hydropulper or Fibre-Pulper for the digester

In conclusion, I believe that there is a definite place in the American pulp and paper economy for straw and bagasse as raw materials. While excellent papers are being made from wood pulps, the blending in of straw or bagasse pulp with these wood pulps will result in papers with properties that cannot be obtained so well from either the wood pulps or the agricultural residue pulps by themselves. Finally I would like to emphasize that the straw and bagasse pulps should not be considered merely as substitute fibrous raw materials to be used only in time of shortage of wood pulps. Rather these agricultural residue pulps must be considered as supplementary raw materials, with a permanent and proper place in the American pulp and paper economy. The American pulp and paper industry needs straw and bagasse.

* Presented at the 33rd Annual Convention of The American Pulp and Paper Mill Superintendents Association in Detroit, Mich.

Monsanto Grants Research Fellowship

A fellowship in forestry at New York State University was established for one year by the Merrimac Division of Monsanto Chemical Co. The University has selected Ralph H. Burroughs Jr., of Pontiac, Mich., for the fellowship. His research will be concerned with chemical means of modifying paper.

Dedicate World's Biggest Paper-Cup Plant

Dedication of what is claimed the world's newest and largest paper cup and container plant was held at Springfield, Mo. by Lily-Tulip Cup Corp. on June 12. The 1,000-foot long plant is devoted exclusively to the manufacture of paper cups and food containers. Enclosing a ten-acre area, the new industrial unit houses manufacturing facilities, offices and warehouse under one roof, and is situated on a hundred acre site.

Limited operations have started, but completion of the installation of machinery is expected to take at least a year. In full operation, the plant will employ between 1,500 and 2,000 people.

Construction was started January 4, 1951, and a little over a year later, on February 25, 1952 paper cup production was started on the first unit of three machines. Eventually, the plant will manufacture the company's complete line numbering hundreds of different kinds of cups and containers. At present, only the Lily single wrap cold drink cup and vending cups ranging in size from 6 to 24 ounces are being made. Within the next several weeks, additional machines equipped to manufacture ice cream cups and hot drink cups will be added to the production line, and local people will be trained to operate them. By the end of 1952, machines that make pleated water and portion control cups, cone shaped water and soda cups and heavy duty double-wrap food containers will be installed.

Frank W. Egan

Partner, Frank W. Egan & Co., Bound Brook, N. J., outlines

Impregnating and Coating of Specialty Papers*

Paper plays an important part in our lives. It is hard to conceive how we could get along without it. Can you imagine being without books, records, newspapers, food and pharmaceutical containers and wraps, cap liners for metal capped bottles; and also money. There are many other paper items that we find are a necessity.

The making of paper and paperboard is an interesting process. In its original form, it can be used for many purposes; for other needs, the paper or paperboard must be converted.

The converting of paper or paperboard involves such operations as printing, creping, laminating, embossing, impregnating and coating.

Currency paper is impregnated with gelatine to help it attain a folding property equal to 4000 double folds.

Metal caps have paper liners coated with protective coatings that resist acid, alkali and alcohol solutions and a wide variety of mixtures; also pulpboard cushions that help seal and protect glass bottles during the capping operation and keep the foodstuffs, pharmaceuticals and cosmetics from contamination, so that they reach the ultimate user in proper condition.

The ink receptivity of paper can be improved by coating it with a clay-casein or a clay-starch mixture. Clay-coated paper or paperboard permits fine screen letterpress or gravure printing having fine detail.

Clay-coated paper acts as a good base for cast strip films.

Paper or paperboard is coated with such resins as vinyl, phenolic, urea, melamine, nitro-cellulose and the hot

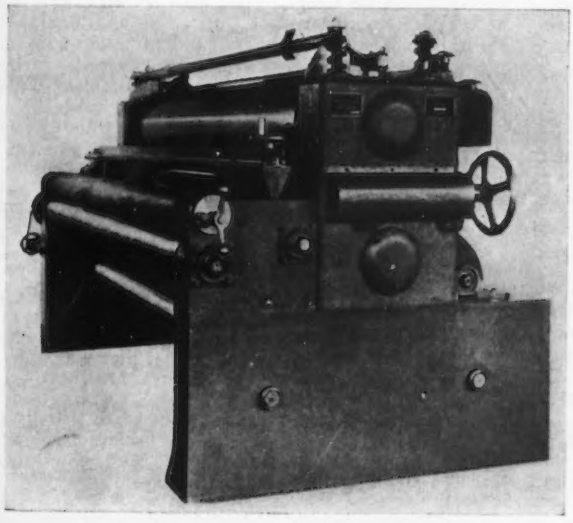
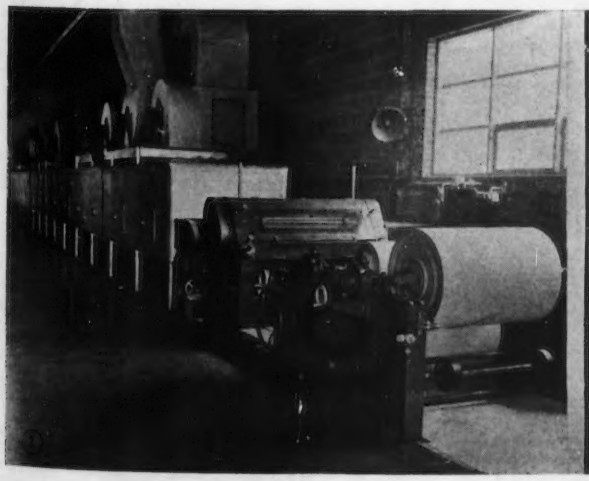


Figure 1—Treater for Laminated Plastics.



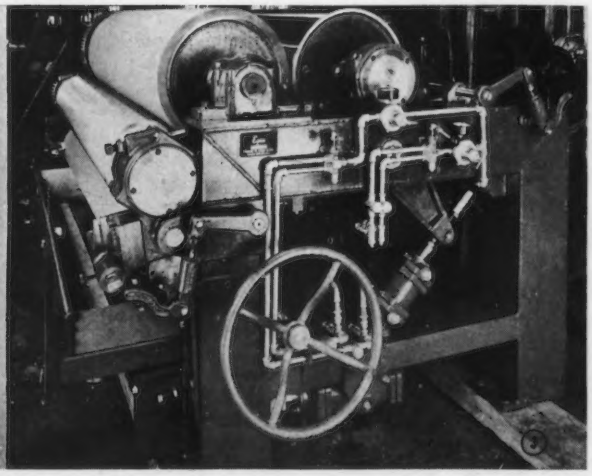
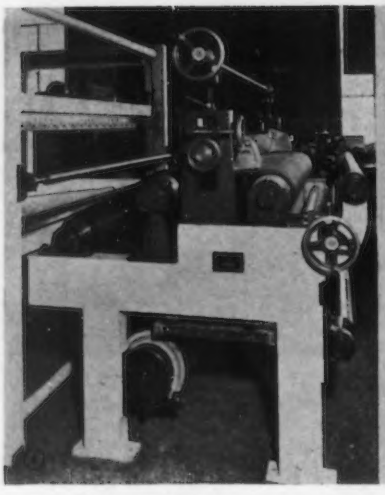
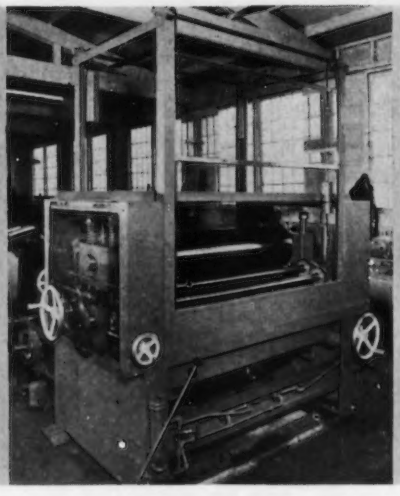


Figure 2—Reverse Roll Coating Unit with Automatic Flying Splice Unroll for Vinyl Coating. Figure 3—Gravture Offset Print Coater.





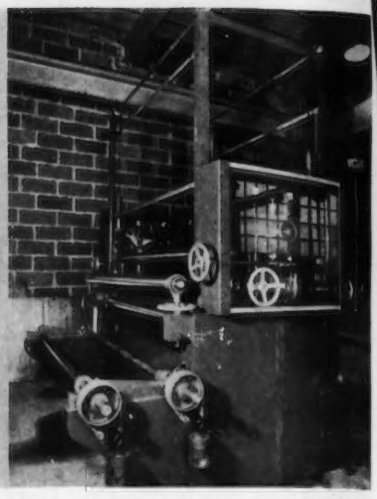


Figure 4—Knife Blanket Coater for Plastisols or Organisols. Figure 5—Treater or Double Coater. Figure 6—Double Coater for Glassine Paper or Acetate Film.

melt group, as well as plastisols and organisols—also with waxes, rubber-waxes, asphalt, tar, gum and shellac—to obtain, among other things, moisture-vapor proofness, adhesion, moisture repellence and dimensional stability, as well as such properties as gloss and ornamental appearance.

Paper or paperboard is impregnated with resins, waxes, gelatines, asphalts and tars to obtain such properties as flexibility, moldability, wet strength, durability and transparency.

There are so many outlets for products derived by coating or impregnating processes that to list them all would be quite a task. To list but a few, we have the following:

Impregnated Products— Paper money, masking tape, laminated plastics, roofing, floor covering, gaskets, and insulation.

Coated Products— Coated paper (label, litho and book), gummed paper, wax paper, lacquer coated paper, resin coated paper, cap liners and heat sealing paper.

Each passing year finds more paper being coated on the papermaking machine. Among the various methods being used to coat on the machine are:

(1) The modified letterpress print coater,
(2) The roll and knife coater, and
(3) The offset gravure print coater

The offset gravure print coater applies eight pounds of clay-starch coating per 25 in. x 38 in.—500 ream basis at a speed exceeding 1000 feet per minute.

The thixotropic or the dilatent properties of the coating determine the type of coating equipment to be used.

To produce a good coated surface, the surface of the paper or paperboard must be level and smooth. A three-roll calender or breaker stack is used, prior to the coating unit, in the paper machine.

Coating applied from a roll causes ribbing. The coarseness of the ribbing is determined by the size of the break away angle. If the web is wide and the coating roll is of large diameter, a small diameter doctor roll, driven in the reverse direction to the web, helps to reduce the ribbing.

The reverse roll coater is a versatile machine. It is used to clay coat paperboard, and to apply gum, resins, lacquers, paints, enamels, varnishes, shellac, and asphalt, also phenolic, melamine, urea and silicone compounds. The chilled iron rolls in a reverse roll coaster can be ground with a straight face because very little pressure is exerted in the nip of the metering and casting rolls. This arrangement permits uniform application of coating to the web regardless of its width.

Knife roll coaters apply high solids coatings of vinyl plastisols and organisols as well as rubber and lacquer compounds of pigments.

Knife blanket coaters produce uniformly coated webs with very little web-tension because the coater blanket supports the web against the face of the coating knife.

The subject of coating methods is taken up in detail in an address presented before the Michigan Division of The American Pulp and Paper Mill Superintendents Assn., Inc., in 1944.

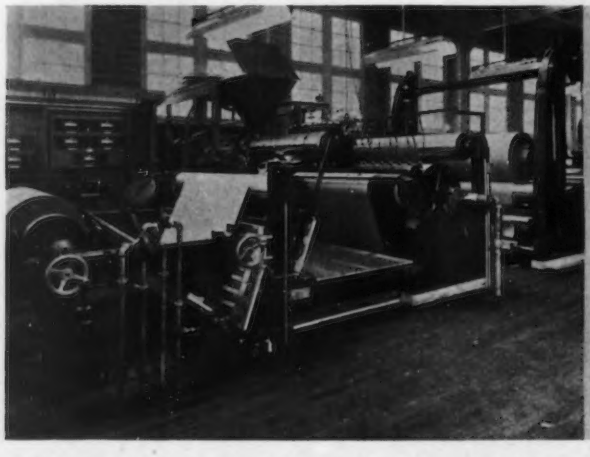


Figure 7—Polyethylene Extruder and Laminator-Coater. Figure 8—Tower Treater for Laminated Plastics or Insulations.

What do you do when it takes hours... sometimes days... to change v-belts?

1 **Put one or several maintenance men on the job**

...and pay for repairs while production stands still

2 **Pay overtime**

...and have repair costs eat away your profits

3 **Standardize on VEELOS...**

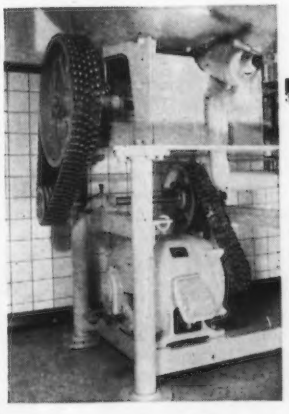
...and change belts in up to 1/10th the time
...save labor, save time and save overtime
...keep machines producing for maximum profit

Comparison proves the value of VEELOS...

Minimum Inventory—4 reels of Veelos in the O, A, B and C widths can replace up to 316 different sizes of endless v-belts. If you use only one width of v-belt you can stock just one reel of Veelos.

Quick Installation—link construction makes it unnecessary to remove outboard bearings.

Complete Adjustability—vibrationless, full power delivery is assured because uniform tension on each belt in a matched set can be maintained.



VEELOS DATA BOOK

gives complete details on construction, installation and uses. We'll gladly send you a free copy of this 28-page fact-full book... write today.

MANHEIM MANUFACTURING & BELTING COMPANY
616 Manbel St., Manheim, Pa.

VEELOS
THE LINK
V-BELT

ADJUSTABLE TO ANY LENGTH · ADAPTABLE TO ANY DRIVE

Made in all widths in three types: regular, oil-proof, static conducting. Also in double V in O, A and B. Packaged on reels in 100-foot lengths. Sales engineers in principal cities; over 350 distributors throughout the country. VEELOS is known as VEELINK outside the United States.

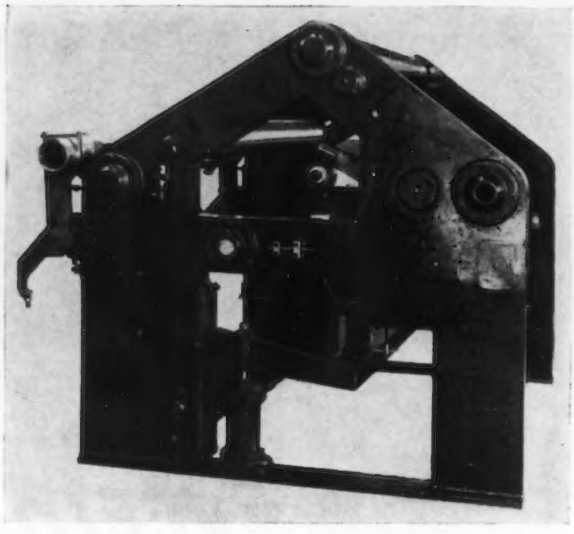


Figure 9—Air Coater for Clay Coated Paper.

The paper is entitled "Some Fundamentals of Coating Methods."

The Technical Assn. of the Pulp and Paper Industry published monograph #8 on the subject "Machinery for Paper Coating." The monograph describes all types of coating equipment.

Solventless coating machines are available for the application of polyethylene and Saran coatings. These coatings are in granular form. Polyethylene is heated to 500° to 600° F. and extruded through a sheeting die and laminated to the web. Saran is heated to 325° F. and applied with a reverse roll coater.

Vinyl, polyethylene and Saran resins are applied to a paper web by means of a calender stack.

Artificial leather, masking tape, shade cloth, floor covering, wallpaper, currency paper, sound-proofing membranes and facsimile paper are just a few of the webs that are impregnated. Some of the webs are coated after they are impregnated.

As each year goes by, more and more paper and paperboard finds new outlets. The potential market becomes greater after the paper or board has been impregnated or coated.

* Presented at the 33rd Annual Convention of The American Pulp and Paper Mill Superintendents Association in Detroit, Mich.

Paper Associations Hold Clambake

Over 150 members of the Allied Paper Salesmen's Assn. and the Empire State Paper Assn. and their guests ragaled themselves to their hearts' content at the first annual clambake held at Hinerwadel's Grove in Syracuse, N. Y. on June 9th. The fun started at three o'clock and held forth until curfew. Doc Lance and his Pumpernickelers Band, under the leadership of "Empire's own drum majorette" Jay Knapp Smith, entertained the group with nostalgic selections and stirring marches during the afternoon and evening.

After an afternoon of good fellowship, raw clams, salt potatoes (no less) and amber brew, the "visiting" firemen sat down to a sumptuous repast of steamed clams, lobster, fried chicken and all the trimmings. When the inner man had been properly satiated with good food, "Allied's own humorist" Bernie (The Wit) Aal fairly convulsed his audience with sparkling wit and humor titled "Quick on the Draw." The unanimous opinion was that the affair be made an annual event.

Arrangements for the clambake were made by the Entertainment Committee of the Allied Paper Salesmen's Assn. with Larry Graham as chairman assisted by Larry Spann, Ray Herzog, George Austin, Walter Fey, Jr. together with "Empire's own master of Ceremonies" J. Vincent McCarthy.

Both the Associations met concurrently on June 10th, at the Hotel Syracuse. Meetings were presided over by Sidney Jones, Jr., president of the Empire and by Edward Deppert, president of the Allied.

Don Baldwin, chairman of the Membership Committee of the Allied Paper Salesmen's Assn., reported that since the first of the year, 17 new members have joined the association and, at the present time, applications have been received from 12 representatives of paper mills and converters. The membership of the association now totals over 130.

At the meeting of the officers and board of directors of the Allied Paper Salesmen's Assn. held Tuesday morning, Mel S. Kelley, chairman of the Endowment Committee, reported that the committee, in co-operation with Professor Clarence E. Libby, of the College of Forestry of Syracuse University, recommended that the association confer a scholarship of $300 on George Lambe, a junior in the pulp and paper course. The plan was unanimously adopted.

After the meeting of both associations, a combined luncheon was served in the ballroom of the Hotel Syracuse, preceded by a social hour.

A meeting of the respective committees for the annual outing and fall meeting at Whiteface was held after the combined luncheon. Co-Chairmen Larry Graham of the Allied group and Aville Prevost for the Empire group presided. The outing is to be held at Whiteface Inn on September 11-13. Members are urged to make their reservations as far in advance as possible.

Customs Court Decisions

Nearly fifty cases in which undervaluation had been found by reason of a difference in the conversion of foreign currency into American dollars have been abandoned by importers, according to a report to the industry by Warren B. Bullock, manager of the Import Committee of the American Paper Industry. The cases include thirty-seven shipments of novel news and other groundwood papers from Canada, and one sheathing, two of bible, three of simplex decalcomania and two of drawing from England.

Customs officials have acted on a variety of classification problems which have come before them. All of the following decisions involved imports at New York except those otherwise specified: Cosmetic wrapping paper from England classified as uncoated paper with a surface design at 4½ cents per pound and 10 percent, not as metal coated paper at 2½ cents per pound and 10 percent; rag and paper base for use as a base for linoleum classified at 10 percent as sheathing paper, not duty free as paper stock; multiwall bags imported from Canada classified by Cincinnati officials as manufactures of paper at 17½ percent, not as manufactures of reinforced paper; rejected plaster board liner returned from Canada, classified by Buffalo officials for duty as paperboard, not duty free as paper stock; corrugating stock from Canada of soft screenings classified by Boston officials as paper not specially provided for at 30 percent, not admitted as kraft wrapping paper at 10 percent; shoe board imported through Boston from Sweden classified for duty as shoe board at 10 percent, not admitted at the 5 percent rate for fiber board; tag board imported through Port Huron classified for duty at 30 percent as paper not specially provided for, not printing paper as claimed by the importer.

Paper with groundwood content, entered as bond paper, was classified for duty at the lower rate for printing paper on the advice of the Import Committee, which could not justify a classification as writing paper.

J. R. Curtis

Scott Paper Co. tells how to get

Increased Production from Existing Machines*

No matter whether you operate a paper mill, a pulp mill, a converting plant, or a hot-dog stand, the key to reduced unit operating costs and increased profits is *greater productivity*. The plant utilizing only a small portion of its productive capacity usually does not remain in business very long due to its high overhead. By the same token, the mill which runs at full capacity, pushing equipment to its efficient limit, yields more sales dollars for every dollar invested. This means greater profits. All of this is very fundamental, and yet in the face of certain operating bottlenecks, many of us fail to strive for increased production. We find it easier to sit by, blaming our low output on mechanical limitations, than to act to eliminate our problems.

I do not profess to be an efficiency or a production expert; but I, like you, have been faced with production problems for many years. For the next few minutes let each of us imagine himself to be a consultant who has been called into a mill to analyze production and to recommend a sound program for increasing plant output. This mill could be your own. Where and how would you start?

New Machine or Old, Revised?

There are two basic methods of increasing production. The easy and sure way is to install additional equipment. However, an additional machine requires more space, greater capital investment, additional personnel and supervision, more equipment and auxiliaries, etc.

The second method is more difficult, but the net return, per dollar invested, is usually much greater. In 95% of the mills, as a consultant, you would be asked how to increase the output of existing equipment. This is the daily problem which faces you as Mill Superintendents.

The truly progressive mill adheres to neither approach exclusively, but rather exploits both methods to advantage. The battle to increase output from existing equipment should be a continuing one, whereas complete new machines should be installed only after careful consideration of market and credit conditions. We have exploited our existing paper machines to the fullest by eliminating one bottleneck after another. Today the same basic machine on which I third-handed in 1935 has more than doubled its speed and even higher production rates are contemplated. This improvement has not been the result of one or two major rebuilds, but rather, has been achieved by continuing revisions each year. Each change has been justified by promising a pay-off in higher production or reduced costs within a two-year period.

Most processes in the industry, whether paper making, pulp making, or converting are subject to this same treatment. Continuing development of this nature is relatively simple to engineer and easy to finance since one or two problems are attacked at a time and the pay-off period is short. Each step, small as it may be, can be made to fit into your overall program. In most cases, the chief difficulty is one of maintaining continuity in the program. When one bottleneck has been overcome, most of us are usually satisfied to sit back and relax, forgetting the many problems yet unsolved.

The Elimination of a Bottleneck

There are three general steps in the practical attack on any production bottleneck, viz:

1. Definition of the problem
2. Engineering and application
3. Follow-up

It is unfortunate that most of us practically ignore steps one and three, feeling that engineering and application alone will solve the problem. In many cases it is difficult to define or state the problem correctly so we bypass it and launch ourselves directly into engineering a solution. We, as consultants, would have to define our problem accurately before making any recommendations.

It is true that much paper mill engineering is done on the basis of "hunches" and "impressions." Many such moves are successful; however best and most consistent gains result from a sound, factual approach. Once we can state the problem clearly and positively, it usually is a simple matter to engineer the solution.

We would probably start our investigation by selecting half a dozen people and asking them the five all-inclusive questions — "how," "what," "when," "where," and "why." We would probably get six different answers to each question. This is natural for each man has made observations which have created impressions; these impressions to him are facts. Analysis of these so-called facts shows a number to be contradictory, and others to be of questionable soundness. Here we must attempt to retrace the individual's line of reasoning and then possibly we may arrive at one or two fairly sound facts from a number of different observations.

For example, an operator having difficulty maintaining clean felts might feel that a different felt design was required when actually some white water was getting into his felt showers. Or he might condemn the Boiler House Superintendent for low steam pressure and poor drying when actually his dryers were partially filled with water.

Several years ago we followed the "impressions" of our operators in the handling of a problem in a machine press section. The machine in question had only two-thirds the vacuum pump capacity available to other machines and, since a machine tender never has enough vacuum, it was generally felt that this was the bottleneck. We installed a pump giving this machine one-third *more* vacuum capacity than any other machine and were greatly disappointed to find the increase in dryness so small as to defy measurement. We had simply not defined our problem properly. (This should not in any way be taken as an indication that increased vacuum pump capacity might not be the solution to some other press section problem.)

The definition of a problem requires at least a sound analysis of existing records and observations, and more frequently calls for several well se-

lected tests or experiments. In our case, we could have piped a pump from an adjoining machine to the questionable press section. Then a few simple moisture tests would have told us that greater pump capacity was not the answer.

The third factor, *follow-up,* is equally important. Maximum gains will never be derived unless the "kinks" are ironed out of a new installation and the operators are thoroughly trained, not only in the use of the equipment, but also as to why it is an improvement, and what is being corrected. The men who operate a new process must understand it and believe in it, or it will never work properly.

The Machine Production Problem

As consultants on a paper mill production problem, we could start our assignment by listing a number of general influences on machine production. These, we would find, fall into three classifications, viz:

A. SPEED

1. Operating bottlenecks which limit *top machine speed*
2. Equipment limitations which prevent continuous operation at top speed

B. LOST TIME

1. Machine snaps and breaks
2. Clothing changes (wires, felts, rolls, etc.)
3. Routine maintenance
4. Engineering Changes
5. Accidents

C. WASTE

1. Excessive waste on turnovers
2. Damage in handling rolls and finished product
3. Rejections for poor quality
4. Excessive waste in converting
5. Inability to use full machine trim

These influences may be summarized in chart form for any machine being analyzed. Suppose the following conditions prevailed at the mill in question:

Basis Weight
20# (480 sheets, 24"x36")
Dryness at Reel 96%
Trim .....120"
Average Reel Speed for
Month (30 days) .....1000 FPM
Maximum Reel Speed in
past .....1200 FPM
Lost time during month
for breaks, etc. .....25 hours
Lost time during month
for clothing .....16 hours
Lost time during month
for accidents ..... 4 hours
Lost time during month
for engineering changes ... 2 hours
Waste and unaccountable losses 40 tons

This particular machine produces 400 pounds of bone dry paper per hour per 100 FPM of speed. Thus, in terms of production, we can prepare the chart in *Figure 1.*

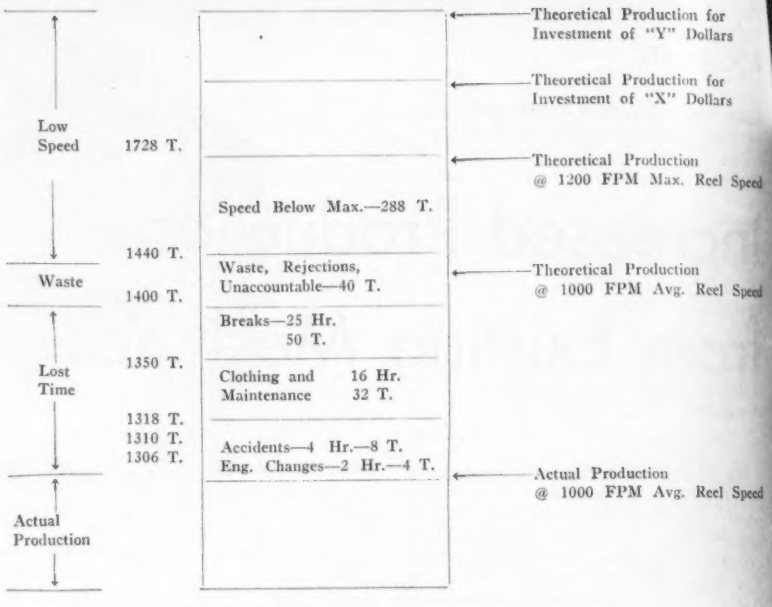


Figure 1—Paper machine Potential Production Chart.

The collection of data on waste and lost time may require special studies and records since all mills do not compile such statistics. An analysis of this data in chart form would quickly indicate the machine potential and points of major inefficiency. Our recommendations would be directed at the elimination of such "bottlenecks." In our final report to Management, we would outline several programs, each costing a given number of dollars, and each increasing the machine potential by a certain tonnage. These points would, of course, be added to the chart later when corrective measures had been formulated. The final recommendations for the solution of each problem in our program would involve some combination of the following:

1. Correct use of existing equipment
2. Engineering changes to permit improved performance
3. Training program to familiarize operators with proper techniques and to secure their active cooperation

So far we have been very general in outlining an approach to a production problem. You all realize that in a discussion of this nature it is impossible to become so specific as to answer each of your production problems. If I possessed that happy faculty, I would certainly hang out a shingle as a "production expert." However, in order to focus your attention on the more practical aspects of the problem, perhaps a few specific examples should be cited. Due to the limited time available, these will be confined to papermaking, although similar programs could be developed for pulp making and for finishing operations. Let us consider briefly the three general factors affecting production, viz:

1. Speed
2. Lost time
3. Waste

The Speed Problem

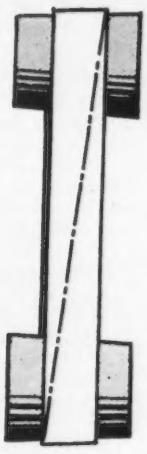
On all machines the gradual increase in speed will eventually make the head-box level a limiting factor. In some cases you will find a considerable head loss from the screen discharge into the headbox limiting the headbox level. This loss can be reduced by enlarging the stock lines and valves or by installing a by-pass. We have, on occasion, temporarily flowed a portion of the headbox stock directly over the screen discharge chamber into the headbox, thus making the levels about equal. Raising the level in the screens is not usually advisable since the tubs deteriorate rapidly when operated full.

The next step, of course, is to raise the headbox and screens. Care must be taken to check the effects on fan pump capacity and headbox walls. It may be necessary to speed up the pump to increase head and capacity, and straps may be required to strengthen headbox walls against increased hydraulic pressure.

If head-room limits the raising of your screens, there are still several alternatives. When there is little air in your headbox stock, you may completely enclose the headbox, and pump directly to the slice. Or, you can pump directly into an airloaded headbox such as Beliot has built.

If you cannot increase your headbox pump capacity otherwise, it is quite possible to operate a smaller pump in parallel with it to give 1-2000 GPM more flow. Friction losses and pump characteristics should be checked carefully for these new conditions to

These Famous Patented ALEXANDER BELTS for the Paper Mill



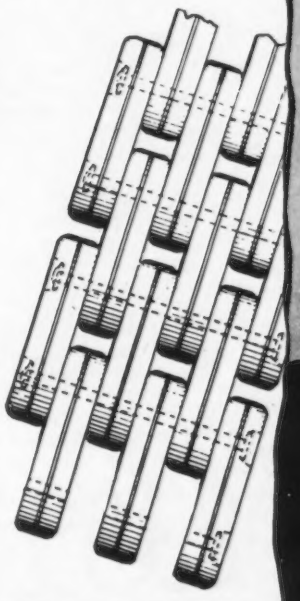
ALEXANDER CONE-MASTER

(PATENTED)

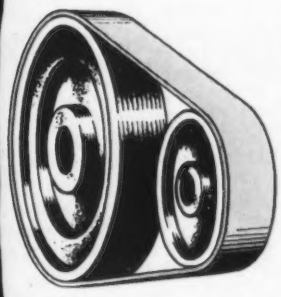
In cone pulley drives the stress line of the belt is *diagonal* . . . from high side to high side of the pulleys. Alexander patented CONEMASTER is the *only* leather belt made to meet this condition. The hides are cut so that the backbone line of strength is parallel to the diagonal line of pull. No other belt hugs the pulleys across the entire face of the belt . . . delivers power so efficiently for so long as CONEMASTER.

ALEXANDER DUPLEX Leather Link Belt

Two-ply construction of links provides greater strength, longer life. It also permits sufficient countersinking of the connecting pin heads and burrs so that they do not come in contact with pulley flanges. DUPLEX is now made with thicker links in the wider belts, providing still greater strength and faster dissipation of internal heat. DUPLEX is the ideal belt for slow, heavy drives where slippage is required.



are Sold by THESE CAPABLE MEN



ALEXANDER MONOBELT

This famous patented Alexander belt is specially designed for the extra tough drives. It provides greater frictional qualities, guaranteed for the normal life of the belt. MONOBELT Double Ply is ideal for operation over small pulleys, because the outer ply is slightly more elastic to compensate for the greater tension to which it is subjected. The result is perfect pulley contact, minimum internal heat, longer life.

SINCE 1867

ALEXANDER BROTHERS BELTING COMPANY

406 North Third Street • Philadelphia 23

insure adequate net combined head and capacity.

Another factor which frequently limits speed on an existing machine is the *drive*. Where drive equipment is overloaded, one should first check all load factors to make certain that none are excessive. It is advisable to develop a check list of such factors for your operators so that each may exercise control over power usage on his machine. Some points to be included would be:

1. *Water in dryers*—The installation of Visiflows in the condensate line will permit observation of condensate flow from each dryer during operation. Plugs installed in dryer heads near the shell will allow you to check for water in the dryer without opening the manhole.

2. Heavily loaded doctors for creping or cleaning dryers, wire rolls and calenders. A doctor blade with a wide, worn heel will increase loads.

3. Bad bearings anywhere on the machine. Check for heat and roughness.

4. High flat box vacuum and filled Fourdrinier wire.

5. Worn or grooved suction box covers.

6. Tight packing strips in suction rolls (press and couch).

7. Poor lubrication of suction roll packing.

8. Tight steam joints.

9. Tight chain drives.

10. Poor drive gear alignment.

11. Etc.

Having assured yourself that these load factors are all reasonable, it would be well to check the D. C. Motor next if this type of drive is employed. The horsepower input to this motor is calculated from the very familiar formula

$$\text{H. P.} = \frac{\text{Volts} \times \text{Amperes}}{746}$$

Your electrician is concerned primarily with the current, or amperes, for to him this means heat, and heat causes baked insulation and ultimate failure. In some cases it is possible to increase the voltage thereby securing the same horsepower output at a lower current input. Since voltage controls speed also, it may be necessary to change the drive sprocket to obtain a proper speed ratio; this is usually a relatively minor change. Your electrical equipment manufacturer will be glad to assist you with such recomendations.

Fortunately, most electrical equipment today is well made and will operate beyond nameplate ratings. *With adequate ventilation* most motors and generators will operate continuously up to 10% above rating; however you must be certain that the heat from such overload is dissipated satisfactorily. Some times the overload must be reduced during hot weather, but even under these conditions it is surprising how much motor protection can be supplied by improved ventilation.

Undoubtedly operation in excess of rating reduces your factor of safety and makes both your electrician and the manufacturer unhappy, since they are responsible for this equipment. However, such operation frequently can be looked upon as a "calculated risk" which is justifiable. Spare equipment, including an armature and field coils, naturally reduces the overall risk. It is not recommended that you overload all your drive equipment by 10%, but I do suggest that arbitrary limitations are not always sound approaches, and under certain conditions a "calculated risk" may be in order.

Another approach to overcoming a drive capacity deficiency is more involved; however in some cases it can be justified by speed and production increases. Where you have adequate generator capacity, but are limited by a drive motor, it is possible to improve the situation by installing a "helper motor." This motor must have proper characteristics so it will follow the main drive motor without hogging the load and upsetting speed regulation The manufacturer will check this feature for you. The helper motor may be connected to any convenient point and does not necessarily have to be tied into the main drive shaft directly.

All of these steps are of a temporary nature and will not eliminate the basic problem of an inadequate drive. However, in many cases it will be possible to increase machine speed considerably before new and heavier equipment becomes mandatory.

Another fundamental problem with old machines involves inadequate drying capacity. Since most of the equipment from the slice to the calenders is devoted to dewatering the sheet, it is obvious that the problem is quite extensive. To many people the term "drying" means only work done in the dryer section itself, and hence they struggle with their dryers in an attempt to solve all drying problems. Let us briefly review the influence of factors ahead of the dryer section upon the work which must be done by the dryers themselves. Following are two typical cases:

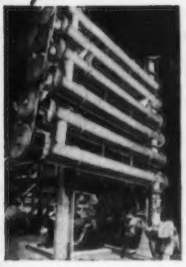
	Case 1	*Case 2*
Sheet dryness entering dryers	28%	30%
Sheet dryness leaving dryers	95%	95%
Pounds water evaporated per pound of paper	$\frac{72-5}{28} = 2.52$	$\frac{70-5}{30} = 2.28$
	$\frac{}{95}$	$\frac{}{95}$
Decrease in water evaporated	24# or 9.5%	

Thus, by increasing the dryness of the sheet entering the dryer section by only 2 percent, the work of the dryers is reduced almost 10 percent. Or, putting it another way, on a machine with 50 dryers, it is equivalent to adding 5. This, combined with the high cost of removing water by evaporation, makes it important to do all possible water removal on the Fourdrinier and in the press section to relieve the dryers. You men are in a far better position than I to outline methods for improving Fourdrinier and press efficiency; however, the following points should be considered:

1. Number and size of table rolls in Fourdrinier
2. Vacuum carried on flat boxes
3. Number of flat boxes
4. Use of lump breaker on suction couch
5. Felt design
6. Felt cleanliness
7. Dryness of felt ahead of nip, particularly last felt where water removal may be primarily a "blotting" action
8. Density of press rolls
9. Open area of suction press. A small hole in a soft rubber cover may squeeze shut in the pressure nip
10. Use of saveall pans around press rolls to prevent water from throwing into felts.
11. Amount of vacuum. There is some question concerning the advantage of vacuum above 14".
12. Width of suction boxes in press rolls. On high speed machines these must be increased in width.
13. Temperature on Fourdrinier and press section. Steam improves drainage of glassine stock and increased water temperature can be a positive influence on any machine from a water removal standpoint
14. Nature of furnish, and stock freeness
15. Number of presses
16. Etc.

An important factor in drying which is frequently overlooked is sheet uniformity. In order to bring heavy and wet streaks in a sheet up to the minimum dryness, it is necessary to overdry the remainder of the sheet. Steam used for overdrying is wasted and reduces machine speed accordingly. For many obvious reasons, every effort should be made to form a uniform sheet. Flow spreaders and numerous flow rectifiers are available for this purpose.

If the basic drying problem actually lies in the dryer section, as it usually does, there are several approaches. First, you must insure complete water removal from your dryers. Even a thin film of water inside the dryer will retard heat flow drastically. Check the surface temperature of your dryers with a surface pyrometer and compare this with the steam temperature. Any large difference probably indicates water in the dryer. At high speeds scoops or dippers are no longer effective and it is necessary to resort to a steam blow-through to sweep condensate out of the dryer. This, of course, means the bucket type trap which empties when full, cannot be used since it does not permit a steam blow-through.



PULP DEFIBERED IN ASPLUND DEFIBRATOR

CHEMI-PULPER®
continuous digester

The ever-increasing, world-wide use of the CHEMI-PULPER continuous digester has mill-proved the value of its principle of continuous cooking under controlled conditions. More and more installations are being made in mills using either hard or soft woods to *economically* make pulps of predetermined quality and yield to meet specific requirements. Such pulps are produced for making .009 for corrugating; flooring, roofing and automotive felts, and insulating board. Effects substantial savings in steam, power and labor costs compared with conventional pulping methods. Bulletin C2 gives the facts . . . yours for the asking.

Manufactured and Sold in Canada by
THE ALEXANDER FLECK LIMITED, OTTAWA, CANADA.

PANDIA

PANDIA INC.
122 EAST 42nd STREET • NEW YORK 17, N. Y.

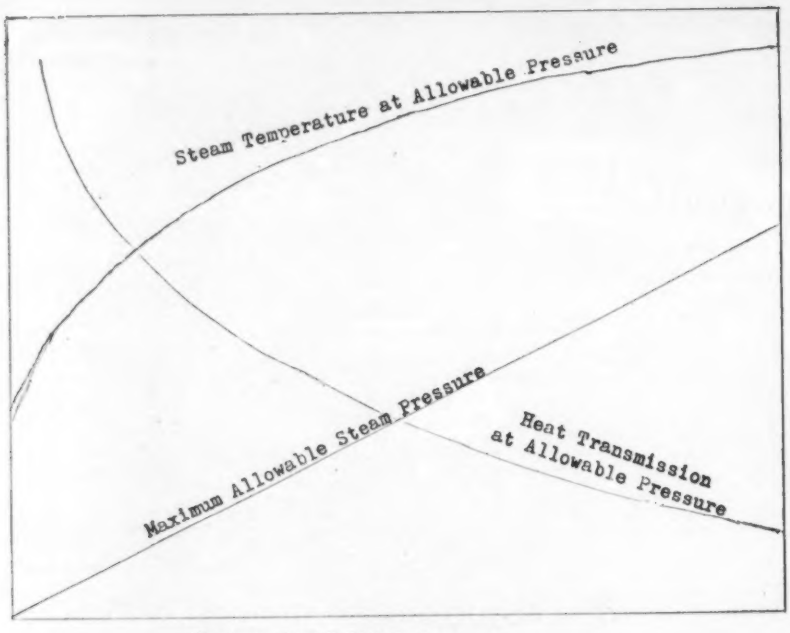

Steam Temperature at Allowable Pressure
Maximum Allowable Steam Pressure
Heat Transmission at Allowable Pressure
Yankee Shell Thickness

Figure 2—Relation of Heat Flow to Shell Thickness

The most common failure of dryer systems is lack of proper differential pressure across the dryers, and particularly the steam joints. Two small pressure gauges installed on each steam joint in the steam and condensate sections, will tell you immediately whether a proper differential exists, and a Visiflow in the line will enable you to see at a glance whether water is moving freely.

Shell thickness is of major importance on large Yankee dryers where the maintenance of a high rate of heat transmission is essential. In some cases drying can be increased by reducing this shell thickness. The increase in drying rate is almost directly proportional to the thickness reduction. As a matter of interest, the ideal Yankee dryer is one whose shell is only thick enough to provide strength to carry its own weight, to resist the pressure roll loading and fatigue due to stress reversals, and to withstand the doctor action. It must have extra metal to permit resurfacing from time to time, and an adequate factor of safety must be provided. However, dryers should not be made thicker than this minimum just to use higher steam pressures. This is explained by the chart in *Figure 2.*

Allowable steam pressure increases directly with shell thickness, but the steam temperature does not increase directly with steam pressure. Since temperature differences control the rate of heat flow, you get more drying from a thinner shell even though you must necessarily reduce steam pressure. In some instances this explains the difference in drying rate between two Yankees which are identical in all other respects.

The use of air will, in many cases, increase drying rates and there are experts in the field to assist with the engineering of such applications. Two principles must be kept in mind in the use of air; viz:

1. You cannot evaporate water into saturated air

2. Moving air increases the rate of evaporation in proportion to the air velocity (not a direct proportion)

The misapplication of air has resulted in a number of disappointments and it is some times well first to spend a few dollars for a trial installation to prove your point. Even compressed air hoses will some times show you what can be expected in the way of increased dryness. You should also run dryness tests to determine the most desirable air temperature to use; many of you may find that air hoods operating at temperatures above 180° - 200° F. are not as efficient as those at lower air temperatures.

On occasion damp dryer felts may be the cause of poor drying and additional felt dryers, higher steam pressure, or air showers may alleviate the trouble.

In isolated and special cases infrared heating may find application to supplement drying capacity, but certainly not to replace steam drying.

There are many other factors which limit speed—some are real and others are matters of judgment. For example, some of you may have placed arbitrary speed limitations on your machines due to open dryer gears, bearing design, etc. I do not recommend that all arbitrary limitations be abolished, but I do suggest that you review them carefully; and perhaps where maintenance is not excessive, a "calculated risk" is in order. We have been able to double the speed of several machines still operating on their original trunnion bearings and open dryer gears. As a matter of information, alternate micarta dryer gears will reduce noise and shock greatly while circulating lubrication systems and central fed bearings will do much to extend bearing life. Both should be considered as part of your speed-up program.

When machines begin to vibrate and sway at high speeds, it is not always necessary to rebuild the whole machine. Reinforce or renew obvious points of weakness. Cross-tie your machine frames and brace them to solid parts of the machine room. Grind your rolls true and balance them carefully. Align your rolls and gearing. You may be surprised how the machine settles down.

Undoubtedly there are other influences which are limiting your machine speed, but none are insurmountable if you approach the problem from the standpoint of "How Can It Be Done"? The initial reaction of most people to a problem is to outline 37 reasons why it won't work or can't be done. Thus, having partially salved their consciences by assuring themselves that the job is impossible, they sit back and do nothing. It usually takes perseverance and initiative to find how to do difficult jobs.

The Lost Time Problem

So far we have discussed only machine speed. Usually, of equal importance, is machine lost time. Just as men are wont to pass off a new idea for a speed increase by citing reasons why it won't work, they find it equally easy to submit to the theory that lost time on a paper machine is essential to operations. No one will dispute the fact that no machine will run continually, but let's look at the reasons for lost time and see what might be done about each to improve the situation.

Cause of Lost Time	*Reduce Down Time by*
1. Machine snaps and breaks	Adequate maintenance
2. Clothing changes	Improved scheduling
3. Routine maintenance	Improved scheduling
4. Major shutdowns (Maintenance and Engineering Changes)	Improved scheduling
5. Accidents	Adequate maintenance —Preventive maintenance

I think you will all agree that *adequate maintenance* and *improved scheduling* will at least minimize the above influences on lost time. I am not going to speak at length on this problem since it was covered in a paper last Fall entitled "Meeting the Challenge of Maintenance and Lost Time in the Paper Mill." This paper

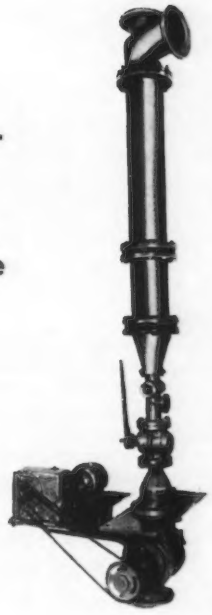
For a **Clean Liner Stock**

The 6" VORTRAP

6" Vortrap with Waste Receiver

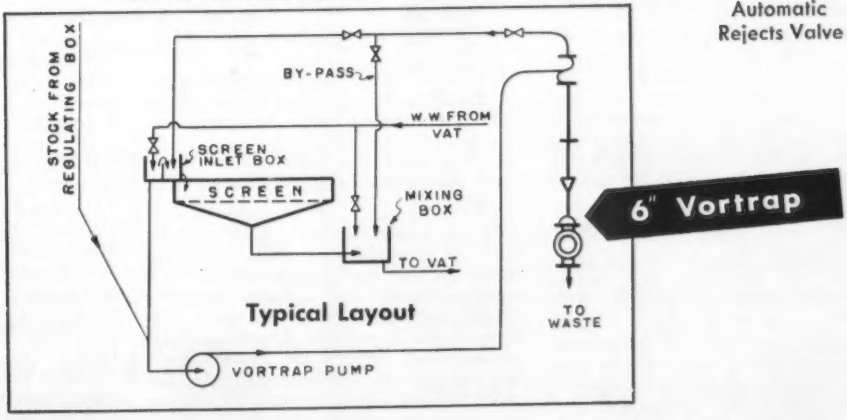
Featuring

1. **High cleaning efficiency.**
2. **Removal of large volumes of sand and foreign matter without plugging.**
3. **Manual or automatic discharge of rejects.**
4. **Simplicity of layout and operation—one unit will handle average cylinder vat.**
5. **Low power consumption.**
6. **Increased screen capacity.**
7. **Minimum space requirements.**
8. **Economies:**
   - (a) Upgrading of stock.
   - (b) Decreased shut down labor—fewer screen washups.
   - (c) More production.
   - (d) Increased wire-felt-equipment life.



6" Vortrap with Automatic Rejects Valve

Write for Sales Bulletin No. 11.



NICHOLS ENGINEERING & RESEARCH CORPORATION

70 Pine Street — New York 5, N. Y.

40 So. Los Robles Ave. Pasadena 1, Calif.—1477 Sherbrooke St., W. Montreal 25, Canada

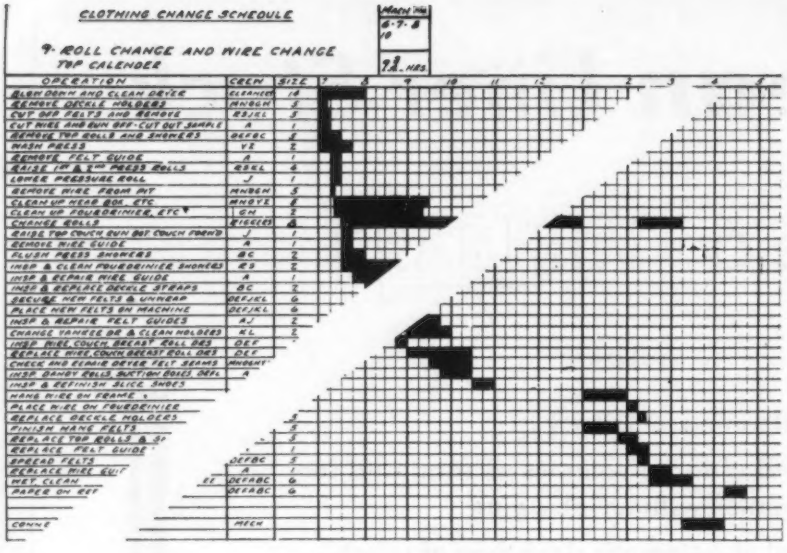


Figure 3

was published *(Paper Trade Journal,* Dec. 21, 1951, p. 16) so I will outline only the high points discussed.

Briefly, we have set up a Maintenance Control Center under the direction of a Maintenance Planning Engineer. This control system, as we have established it at Chester, has been so successful, not only in reducing down time for clothing changes by one-third, but also in reducing maintenance, that we are extending it to other plants. All orders for maintenance or engineering changes pass through this Center for scheduling purposes. The group is primarily concerned with clothing changes, but also schedules work for major machine and equipment shutdowns. They have established time requirements for both repetitive and special work projects; in fact there are standard charts for each machine and each type of clothing change covering the sequence of operations and time allowances for routine work. An example is shown in *Figure 3.*

There are two fundamentals involved in sound scheduling of maintenance work, viz:

1. Determine the controlling project and reduce its time requirements to a minimum

2. Provide adequate personnel, equipment, prefabrication, etc., to permit all secondary jobs to be done within this minimum time allowance.

Scheduling is done at a "work meeting" attended by representatives of all trades involved in the shutdown. In this manner all major interferences and complications are resolved prior to the shutdown.

During the shutdown the Control Center coordinates the overall operation, revising the schedule and work load as necessary. It also notes time requirements and causes for delays so that a more realistic schedule can be established for the next shutdown.

If lost time and maintenance are problems with you, a conscientious job of scheduling will pay real dividends.

Waste

The problem of high waste is usually a serious one, but it is so special in each mill that a general treatment is not possible. Let us only outline a few of the more obvious points to be considered:

1. Excessive waste on turnovers (Breaks, bad starts, sampling, etc.)
2. Damage to rolls and finished product
3. Rejections for poor quality
4. Inability to run full width sheet (Poor spread rolls, bad deckles) etc.
5. Poor converting efficiency
6. Unaccounted losses
7. Etc.

In our waste program, our first problem was to establish a means for measuring the loss due to each cause. This enabled us to plot a chart showing trends and the effects of changes. The second phase was the development of methods for reducing the losses to bare minimums, and this naturally was the most difficult assignment. The third step was one which is too often neglected, viz: the training of personnel, and follow-up. Unless your operators know what you are attempting to accomplish, and why, your program will never be a complete success.

Summary

In conclusion I would like to say that most machines are not "all in." More production can be obtained at moderate investments by:

1. Eliminating bottlenecks limiting *speed*
2. Reducing *lost time* by proper scheduling
3. Reducing *waste*

Give top priority to projects which will yield a quick return—not necessarily to the easy jobs.

In attacking any of these problems be certain that you have defined and stated the problem correctly; the solution is then a matter of straight-forward engineering.

Finally, don't overlook the personnel factor and its influence on production. If your people believe in your objectives and understand your program, production will in many cases increase without the expenditure of a single dollar.

* Presented at the 33rd Annual Convention of The American Pulp and Paper Mill Superintendents Assn. in Detroit, Mich.

Study Usefulness of Torula Yeast as Hog Feed

Consolidated Water Power & Paper Co. has contracted with Iowa State College, Ames, Iowa, to carry on a two-year study of the usefulness of torula yeast as a nutritional supplement in hog feeding.

Funds for the reasearch are being provided by Consolidated. Torula yeast is being supplied by Rhinelander Paper Co., which has the only American yeast-process plant for treating spent sulphite liquor.

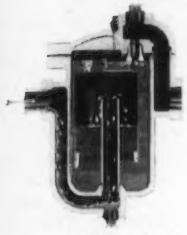
The yeast process is recognized as one of the best ways yet discovered by the sulphite pulp industry to cut sulphite stream pollution, which harms fish by lowering the dissolved oxygen in the water. The yeast treatment process is so expensive that part of the costs must be defrayed by sale of the torula yeast produced, and most of the yeast manufactured at Rhinelander has gone into various types of animal and poultry feeds.

If the industry can find broader markets for this yeast, it could support more yeast-process treatment plants. The Iowa State project under Dr. Damon Catron, professor of animal husbandry, will supplement a swine feeding study already under way at Michigan State College which is being paid for by the Sulphite Pulp Manufacturers' Research League of Appleton.

Under the new research contract, Iowa State College agrees to report its findings annually. These will be available not only to Consolidated, but also to all members of the Research League, which is the organization through which thirteen Wisconsin pulp mills carry on cooperative research to reduce sulphite stream pollution. A. J. Wiley of Appleton, technical director of the League, will act as coordinator of the Iowa study.

ARMSTRONG PRODUCTS FOR BETTER PAPER MILL PERFORMANCE

SPECIAL TRAPS FOR DRYER DRAINAGE



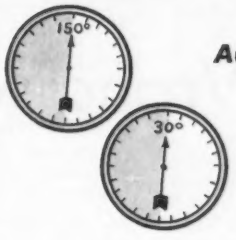
Better Performance, Low First Cost, Low Maintenance.

USE of an individual Armstrong trap on each paper machine dryer insures quick removal of condensate, air and incondensible gases at any pressure, provides higher operating temperatures. The cost is far less than for more elaborate systems and the special new Armstrong paper machine trap gives you long life with low maintenance. Quality is guaranteed.

BULLETIN NO. 205 ➧

. . . explains why you can depend on Armstrong paper machine trap performance. Send for a copy.

INDIVIDUAL DRYER TEMPERATURE CONTROL FOR PAPER MACHINES



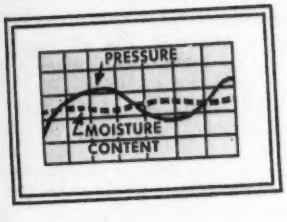
Automatically maintains dryer temperature at any point from 100°F to 250°F

THIS control mixes air with steam to maintain relatively cool wet end dryers. This prevents the sheet from sticking to the dryer surface and avoids curl or cockle due to overdrying on one side. The rest of the machine operates at maximum temperature.

BULLETIN NO. 187 ➧

. . . explains the Control and its advantages. Write for a free copy.

MOISTURE CONTROL SYSTEM FOR PAPER MACHINES



Automatically maintains very uniform sheet moisture content at any desired percent

THIS control maintains much more accurate sheet moisture content than is possible with hand control or constant steam pressure. It detects moisture content changes as the sheet passes over an "indicating dryer" and then varies steam pressure on the entire machine to compensate for the moisture variation.

BULLETIN NO. 196 ➧

. . . tells how the Moisture Control works, explains the specially designed components, lists the advantages. Send for your copy.

STEAM HUMIDIFIERS FOR PAPER STORAGE

Automatically adds moisture to maintain any desired relative humidity

ARMSTRONG Steam Humidifiers prevent the headaches caused by moisture loss from paper in storage; eliminate printing and converting problems. They connect into existing steam systems in much the same way as unit heaters, are economical, accurate, quiet, dripless. A size and type for every requirement.

BULLETIN NO. 1772 ➧

. . . discusses relative humidity, gives data and prices on Armstrong Humidifiers, explains hookups, selection, etc. Send for your copy.

ARMSTRONG MACHINE WORKS

818 Hoffman Street • Three Rivers, Michigan

Peter R. Scott

Field Superintendent, C. B. Cottrell & Sons Co., outlines some problems of the printing press manufacturer in

What Is Wrong with Paperboard?*

Printing multi-color folding boxes by the rotary, wet letterpress method, employs printing presses of the same type that is used for multi-color pages and covers of fancy catalog and publication work. National Geographic, McCall's, Esquire, etc., are good examples of such work.

A magazine-type press, introduced by the firm with which I am associated, is the first and only rotary that has been redesigned to handle boxboard. The new design was necessary in order to met the complexity of conditions present in high speed printing of such paper as contrasted with most other types of paper.

Because of the numerous and short cycles involved, from separating a sheet of boxboard to delivering it flat and accurately, all printed in five colors, new devices had to be made and existing ones had to be strengthened to guarantee the accuracy needed in the printed product.

Of course, these changes and others contemplated are helping to increase running speeds and net production in plants using ultra-modern equipment, but basic quality of boxboard concerning uniformity and elimination of certain variables are absolutely essential to obtain the real potential of such high production equipment. In cases where such quality improvement has been seriously followed up, phenomenal results are being obtained.

The boxboard press is made in 2-color, 3-color and 5-color models, taking a maximum sheet up to 48 in. x 71 in. The 5-color model is proving to be the most used and, therefore, the one to be discussed here. A press of this type can handle boxboard up to .030 in. (30 points) thick in five colors of highest quality in a single pass. It will run at speeds up to 5,000 sheets per hour. This production means that a sheet of paperboard weighing about 1½ pounds is lifted from a pile by vacuum and passed through the press, printed in five colors, and delivered onto another pile uniformly, at a rate of approximately ⅔ of a second per sheet.

The board is fed into the press by a mechanical feeder. There is, and has been, considerable discussion about this attachment being made to take care of such variations in board as curl, etc., in all cases where speed and quality are desired, it is very important to have the board reasonably flat. The vacuum suckers should not have to go searching for the sheets to pick up. Also, the sheet should not buckle and break the vacuum.

It should be kept in mind that the time period from the lifting of the sheet from the pile until it is delivered is less than ⅔ of a second. Nothing should be allowed to upset this operation and, thereby, delay the delivery of the sheet.

The printing on the press is accomplished by using a metal plate for each color desired. If there are five colors to any one carton, five individual plates are used—one being located at each plate cylinder. Electrotype plates are most commonly used. These plates commonly are in the form of a copper shell with a nickel face, backed up with a metal consisting of approximately 90 percent or more of lead. The total thickness of a plate would be approximately 3/16 in. On cardboard it is sometimes necessary to use chrome on the face to protect it against the abrasiveness of the titanium dioxide used in the inks. A set of plates for a press of this size, consisting of 80 plates or more, would cost from $1,000 on up. I have seen sets costing over $2,500.

The initial investment for a press of this type would be approximately $180,000. This investment, plus the operating cost, makes the continuous operation of the press important. The value of a sheet of paperboard also greatly increases after it has been printed, so it is important that the sheets are not damaged while being run through the press. When a press stands idle because of damage to plates and packing, or for other reasons, there is considerable monetary loss due to downtime, plus the actual loss of production.

I believe the No. 1 headache on a press running paperboard is the scrap found in the piles. On a press of this type, it is necessary to turn over all stock and re-pile. In this way, some of the scrap is found; but it is surprising how much is missed. This scrap can be anything from a piece of board ½ in. square, or long narrow strips, up to large sections of sheets. When this scrap passes into the press, it not only damages plates, but also the packing. In some cases, it will keep a press "down" for a long period of time until new plates are procured.

The press is equipped with "detectors" to try and catch any scrap going through, but it seems as if it is just impossible to catch it all. In some cases, there are as many as six detectors across the sheet.

When we depend on a detecting device to locate this scrap, we again face the possibility of trouble because of thickness variations in the board. These sheets are fed into the press in a stream—one sheet over-lapping the other. Because of this over-lapping condition and the variation in the board caliper, the detectors have to be set with plenty of clearance to prevent the accumulation of the variation from continually stopping the press. Because of this light setting of the detectors to take care of the caliper variation, I say again that when a piece of scrap comes through we are apt to miss *it*.

When starting up new equipment in a customer's plant, we inquire as to how much the board will vary in thickness. Usually we are told that it will not vary over plus or minus .001 in. When it arrives at the press, however, we sometimes find that the variation, from minimum to maximum, may be as much as .008 in. to .009 in.

As this condition exists in so many plants, we now prepare the press to print even with these variations. This means that, when a sheet is to the plus side, the squeeze on the plates is very heavy. This squeeze does not do the plates any good and does not help toward good printing. If such a condition continues throughout the run, the life of the plates is shortened; and, of course, the quality of the printed work will not be up to standard.

Our next hidden hazard is the hard spots in paperboard. During the month of February (1952) we started up a press in a plant where the board had been purchased from another company. Every report I received from

our press erector during the start-up read the same . . . "waiting for *plates* damaged because of hard spots in the cardboard." These spots varied from the size of a pea to the size of a half dollar. In some cases, they were much more than twice the thickness of the board being run. This condition not only caused downtime, but was very costly to the customer. Damaged plates had to be replaced, also the packing; and then, too, there was the additional expense of extra men who were on the job at the time of starting-up.

On a press in another plant, we were running along one day when a metal washer appeared—bedded in one of the plates. This washer was traced to a sheet of paperboard.

We also have some trouble with sheets that are trimmed short. This condition stops the press since the sheets do not arrive at the intake cylinder properly. In line with the press delay caused by short sheets is the side registering of sheets slit on the bias. These sheets will run out of square as much as ⅛ in. to the foot. Some of the edges are concave and some convex. Another serious condition is poor slitting on the guide edges. At times, these edges have the appearance of being squeezed apart, rather than being clean cut. This gives a sort of feather edge; which, when registering the printed matter on the sheets, will vary in its location. Referred to as poor side guiding, it can not be helped because of the ragged condition on the edge of the board.

We are often asked why the press will not run stock that is curled. May I quote an enginer from one of the leading feeder companies during a visit to one of the large boxboard converting plants, he had this to say: "The writer made some study of your piles and noticed instances where pile conditions were definitely detrimental to high speed operation. Where stock had a tendency to curl down, a short skid only increased this curl. Bad dents in these same piles made even slow operation questionable. While we realize that all piles are not perfect, we must face the fact that a flat, even pile will allow higher operating speeds and that increased attention to these stock conditions is a major factor in running speeds."

A short time ago, one of our service men was sent to a plant where considerable trouble was being experienced in printing paperboard. It turned out that the job in question required 100 tons of board. As this board was being run in a small mill, it was found that the mill had to change its formula about three-quarters of the way through the run because of certain furnish shortages. In this particular case, the printer had trouble running the board. The ink did not print the same; the plates just would not register. When the texture of the board is changed this way, and the durometer is changed either to softer or harder board, it means starting all over on the press and having the inks made differently. These changes become very costly, so most printers just worry through the job at slower speeds and sacrifice quality.

We sometimes receive calls that a press is not registering its colors properly; and we travel considerable distances only to find that, regardless of what press the board is run on, we get the same result. Close examination reveals that the board varies in color, and some sections of the load appear to be damper than others—not different loads, but variations in the same load. The cause of this condition is a mystery; the fact that it exists is a headache.

In short, it is a certainty that high speed efficient printing, with ever increasing quality demands, requires every bit of ingenuity on the part of board mill operators to improve quality and particularly, to meet some of the conditions just related. This attack, together with continuous engineering improvement of existing devices and the future invention of improved devices and processes, is, and must be, our mutual aim.

My short resume of our mutual problems only scratches the surface, but I hope that questions you may have as a result of it will reveal other items for discussion here.

*Presented at the 33rd Annual Convention of the American Pulp and Paper Mill Superintendent's Assn., Detroit, Mich.

AUSTRALIA AND NEW ZEALAND NEWS

Total newsprint imports to Australia during the month of January were 19,820 tons valued at £2,137,863, an increase of 9,898 tons on the December figure. Other printing paper imports totalled 7,694 tons valued at £1,374,709, an increase of 5,069 tons.

Sydney's "Newspaper News" is of the opinion that newsprint prospects seem to be brighter, and a recent editorial says: "During last month considerable progress was made towards clarification of the position regarding imports of various types of paper from world sources. Decisions were made concerning the manner in which the Commonwealth Government's policy of sterling import restrictions will be implemented, and consideration was given to the re-issue of import licenses for newsprint from dollar areas . . . When recent governmental decisions are put into effect, supplies of newsprint will be made available in relation to each publishers' consumption during the quarter ended June 30, 1950 . . . Full consideration has yet to be given to the question of imports of magazine paper. Use of most other types of printing paper is already limited to 60 per cent of quantities imported during the year ended June 30, 1951.

"It will be remembered that some considerable time ago the Government agreed to the importation of newsprint from Canada to the extent of 45,000 tons during 1951 and 25,000 tons during each of the years 1952 and 1953, subject, of course, to the availability of dollars. Dollars have already been made available in respect of the 45,000 tons and import licenses have been issued accordingly. In March last, however, shortly after imposing restrictions on imports of goods from sterling sources, the Commonwealth Government directed that all licenses which had not been fully availed of be recalled and reconsidered. Revalidation has now been granted for licenses in respect of all quantities of newsprint which were paid for, covered by irrevocable letters of credit established prior to March 21, or were in transit from factories on or before that date. . . . The Inter-Department Dollar Committee is expected shortly to submit a report to the Government on the important question of the issue of import licenses in respect of the balance of this year's quota of 25,000 tons of Canadian print. The period of three months ended June 30, 1950, has been accepted as a yardstick for the importation of Canadian newsprint, consumption figures during that time being taken as a basis for future action."

* * * *

New Zealand's £1 million chemical pulp mill at Kinleith is rapidly taking shape. Managing director David Henry says that the minimum estimated output of 25,000 tons of kraft pulp yearly will be stepped up to a maximum of 45,000 tons, and of this, 12,500 tons will be exported to the mills of Australian Newsprint Ltd. in Tasmania, where it will be blended with groundwood pulp for newsprint production.

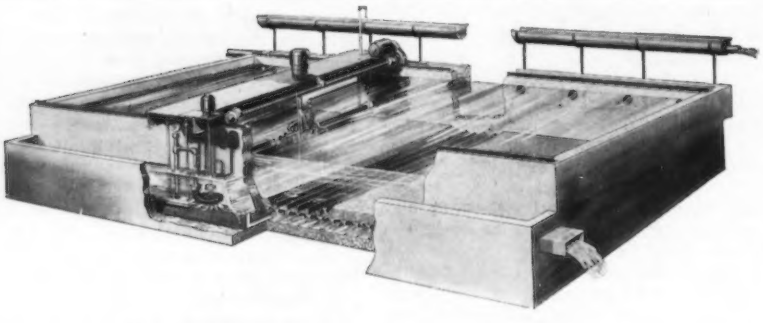
* * * *

Thomas Owen and Co. (Australia) Ltd. has completed one section of its new mill at Burnie, Tasmania, and is making trial runs of the first papermaking machine installed. Output will consist of parchment for butter and food wrapping. To date all this type of paper has been imported, but the new mill will eventually make both Australia and New Zealand independent of overseas markets. Initial production is expected to be 2,000 tons a year, but a greater output is possible. Second machine will be for specialty papers. including fine printing and writing papers, and a third machine will be installed later.

L. A. Kramer

Victor Chemical Works cites the application of

Polyphosphates in the Paper Industry*

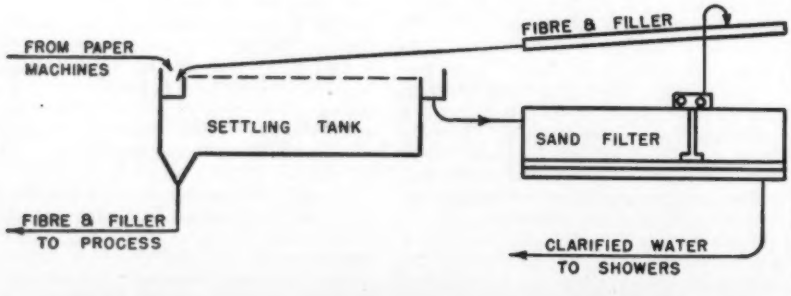


It *CLEANS ITSELF* while filtering!

Here is the paper plant engineer's dream come true! . . . a sand filter which cleans itself—automatically—with no interruption whatever to the filtering operation. No shut-down or change-over is necessary while cleaning is in progress.

The HARDINGE AUTOMATIC BACKWASH SAND FILTER has proven useful in the paper industry handling paper mill waste water or excess "white water." The fibre and filler may be recovered and reused, as shown in the diagram below, while the effluent water is sufficiently free of suspended matter for reuse on showers.

Write for new catalog just issued, Bulletin 46-A-14.



HARDINGE
COMPANY, INCORPORATED

YORK, PENNSYLVANIA—240 Arch St. Main Office and Works

NEW YORK 17 • SAN FRANCISCO 11 • CHICAGO 6 • HIBBING, MINN. • TORONTO 1
122 E. 42nd St. 24 California St. 205 W. Wacker Dr. 2016 First Ave. 200 Bay St.

The name polyphosphate is actually a family name. Most of the polyphosphates have one distinguishing family characteristic and that is that they are the result of the high temperature dehydration of the simpler sodium and potassium phosphates.

The polyphosphates, because of their unique chemical and physical properties, have in recent years found many uses in a variety of industries. Tetrasodium pyrophosphate and sodium tripolyphosphate, two prominent members of this family, and both of which enjoy wide distribution and relatively low cost levels, play indispensable roles in soap manufacturing, conditioning of oil drilling muds, purifying of china clay, de-inking of newsprint, detergent compounding, and water softening. These industries have one thing in common—that is, they each use tremendous amounts of water per unit weight of product. In this respect, the pulp and paper industry is no outsider.

Water Treatment

One of the best known uses of polyphosphates is in water softening to combat calcium and magnesium hardness. When the polyphosphates are used for this purpose, unlike with many other water softening chemicals, troublesome precipitates are eliminated.

One of the first polyphosphates to be developed for this service was tetrasodium pyrophosphate. The effect of this compound, when used in hard water, can be seen in *Figure 1*. The two graduates, as illustrated, are filled with water at 150 ppm hardness and contain soap. The cylinder on the left actually contains more anhydrous soap than its partner but it shows no suds because all of the soap has been consumed in softening the water. The cylinder on the right, which contains the lesser amount of soap, has abundant suds. The pyrophosphate present in the water has liberated the soap from combination with magnesium, thus making it available for sudsing and detergent purposes. Tetrasodium pyrophosphate also peptizes or disperses calcium precipitates.

Sodium tripolyphosphate, when used with soaps in hard water, acts in much the same manner as tetrasodium pyro-

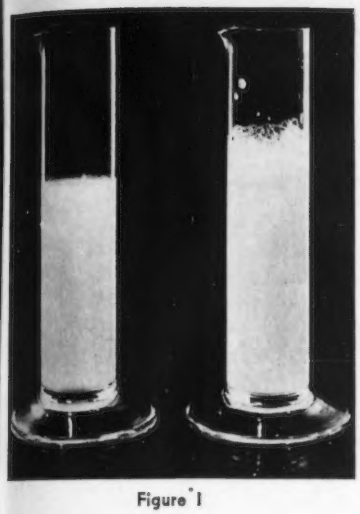


Figure 1

phosphate. In fact, the two compounds are essentially equivalent in their peptizing power. The tripolyphosphate, however, has a higher calcium repression value. Hence, it is superior so far as water softening alone is considered.

Sodium tripolyphosphate is recommended for all general water softening purposes. *Figure 2* displays a graph showing the pronounced effect of sodium tripolyphosphate upon waters of different hardnesses. The graph reveals that complete softening can be achieved by the use of small amounts of this polyphosphate.

Application of sodium tripolyphosphate is recommended especially for the prevention of scale deposit in washing systems and in the evaporation of waste lyes. This scale inhibition takes place at concentrations of polyphosphate far below that required for softening the water. The polyphosphate simply inhibits the crystallization of scale.

Pitch Control

Although the largest, single, industrial use or commercial application of sodium tripolyphosphate and tetrasodium pyrophosphate utilizes the water softening and soap building properties of these two compounds,

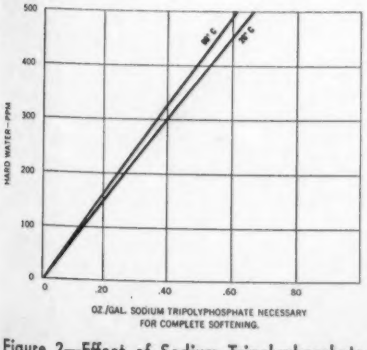


Figure 2—Effect of Sodium Tripolyphosphate Upon Hardness

another very important characteristic of the materials is their peptizing power. This peptizing action is of especial value in cases where a negatively charged material is of gummy, adhesive, or viscous nature. The polyphosphates, in such instances, prevent the finely divided particles resulting from its action with the negatively charged material, from adhering or depositing as sticky masses.

Since the polyphosphates give negative ions of high valence in solution, it follows that they are exceptionally efficient in peptizing negative colloids. In other words, the polyphosphates hold such materials in suspension and stabilize them. They also are useful in coagulating or precipitating positive colloids.

The peptizing action of the polyphosphates is excellently illustrated in *Figure 3*. Both cylinders in the exhibit contain hard water to which trisodium phosphate has been added. One cylinder, in addition, contains a small amount of tetrasodium pyrophosphate. The water without the tetrasodium pyrophosphate shows a sludgy precipitate of calcium phosphate and magnesium hydroxide. The sludge in the pyrophosphate-treated water is peptized and cannot coagulate.

The pulp and paper industry has made use of this property of pyrophosphate in pitch control, in rayon pulp bleaching, and in the deflocculation of clay. As polyphosphates become better known to the industry, further ap-

IF IT'S A DEXTRINE, STARCH OR ADHESIVE PROBLEM..

"Put it up to Morningstar"

ESTABLISHED 1851

Let Our Paper Department Experts Give You Valuable Aid on..

1. TUB AND COATING STARCHES
2. TAPIOCA FLOURS
3. CONVERTED POTATO STARCHES
4. LAMINATING ADHESIVES
5. BAG PASTES
6. CORRUGATING STARCHES
7. MANNOGAL (Mannan-Galactan) PRODUCTS

Morningstar's modern laboratories and technical experts can lend you valuable aid on your Dextrine, Starch and Adhesive problems. Years of intensive research have resulted in the development and perfection of a specialty line of exclusive products for the paper industry. Without obligation, our paper specialists will gladly study your individual mill requirements and recommend the most efficient and economical formula to improve the operation you describe.

WRITE US—TELL US ABOUT YOUR NEEDS!

MORNINGSTAR, NICOL, INC.

630 WEST 51st STREET, NEW YORK 19, NEW YORK

1770 CANALPORT AVENUE CHICAGO 16, ILLINOIS

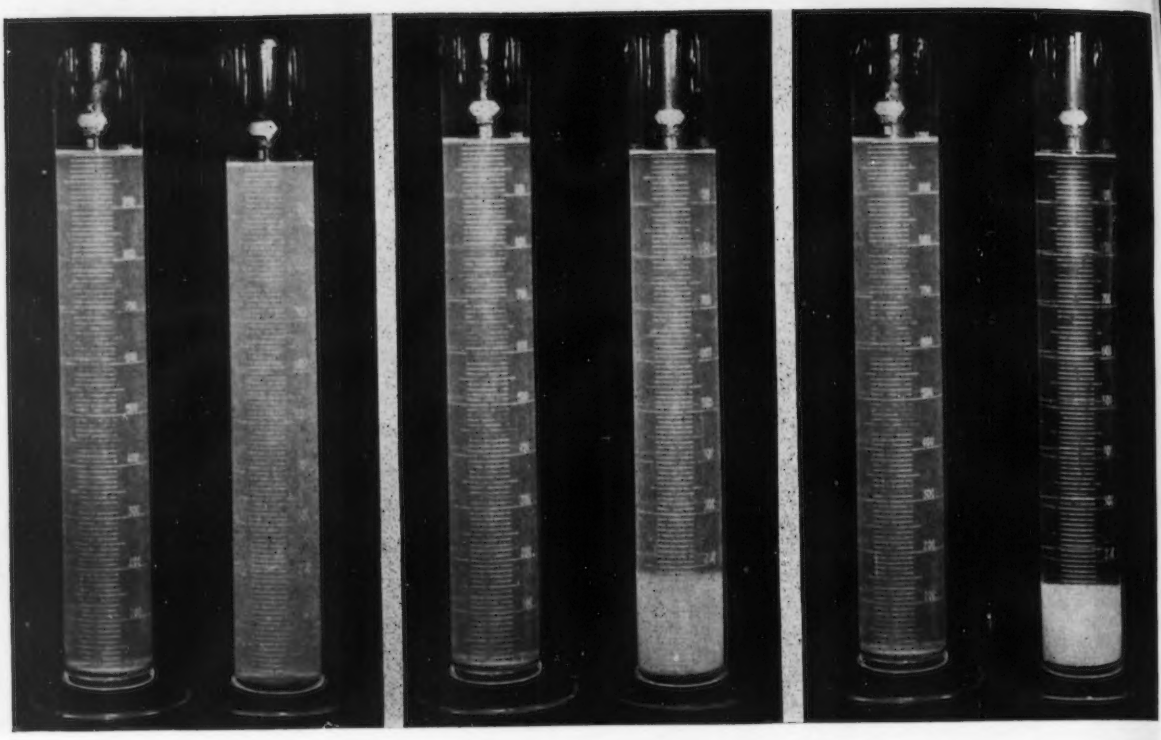


Figure 3

Paper Chemist

● With a minimum of three years' experience in the manufacture of paper, to assist in IBM card stock paper program.

Should have a good knowledge of the chemistry of paper, with a degree in chemistry or equivalent practical experience.

Excellent working and living conditions, good salary, moving expenses paid, exceptional employee benefits.

Write, giving full details, including education and experience, to:

R. H. Austin, Personnel Director,
International Business Machines Corp.
Endicott, New York.

PRICE & PIERCE
LTD.

Wood Pulp
and
Paper
Agents

60 E. 42 ST., N. Y. 17

plication for them will suggest themselves.

The deposition of pitch in the manufacture of paper, especially in the presence of hard water, has long been troublesome. Dispersed pitch, a negative colloid, is partially coagulated by the calcium and magnesium ions of the hard water. This difficulty, in the past, has been met by using alum to coagulate the pitch before the trouble-making stage was reached.

The modern method for meeting the difficulty makes use of the powerful phosphatic peptizing agents. They keep the colloidal pitch dispersed even in the presence of hard water.

These polyphosphate chemicals have two distinct advantages over alum. First, they are alkaline and function in alkaline solution. They do not, therefore, cause corrosion troubles, such as are encountered when alum is employed and which decomposes to give an acidic solution of low pH. Second, the amount of polyphosphate necessary to achieve the peptizing effect is less than in the case where alum is added and is therefore more economical.

One case is known of a newsprint mill in which pitch was introduced by the groundwood, calcium by the sulfite, and to add to its troubles, it had a rather hard water to handle. The mill found that the pitch could be kept in suspension by adding only one pound of sodium polyphosphate per ton of wood.[1] The polyphosphate was introduced from a wooden dissolving box at a constant rate into the head of each grinder magazine. This treatment was found to be completely effective and has now replaced the former alum procedure entirely. It should be emphasized, however, that the alum and phosphate processes must not be combined since one process neutralizes the effect of the other.

At another mill, pitch difficulties were experienced only at the start of operations, such as at the beginning of a work-week, because of an influx of hard water. This difficulty was overcome by adding 20 pounds of polyphosphate to the mixed stock chest prior to shutdown for the weekend. Continuous additions of polyphosphate at rates varying from ½ to 2 pounds per ton of wood,[1] depending upon pitch content, have been shown by plant runs to be most effective. The beneficial effect of the treatment has been checked repeatedly by stopping the addition and then by later resuming it.

Other Pulp Applications

The polyphosphates perform several useful functions in the manufacture of rayon pulp. They not only aid in washing and bleaching, but they also give iron control in the process. So far as bleaching is concerned, they have two applications; namely, in the washing of the digested pulp before bleaching, and in the bleach itself.

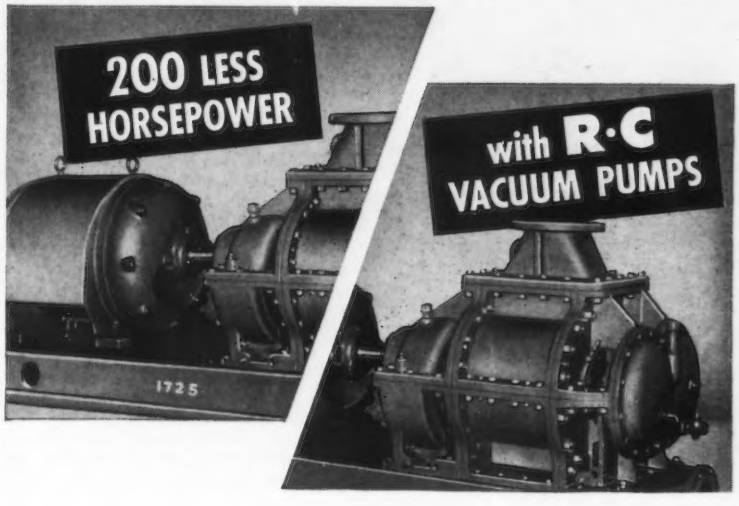
[1] H. Freeman, Pulp & Paper Magazine of Canada 48, No. 8, 73-75, July '47.

The use of sodium polyphosphates in the wash water at the blow pits or in subsequent screening operations reduce the amount of chlorine required to give a standard brightness. The resulting milder bleaching treatment means greater fiber strength. In the bleach itself, it is logical to remove as much coloring matter as possible by suspension and washing instead of putting the burden of removal upon the bleach. Here the peptizing effect of the polyphosphates will be found most valuable.

Since rayon pulp is required to have a very low iron content, the sodium polyphosphates contribute another valuable function. By forming a clear sol with iron, they hold the latter in solution so that it may be readily washed out of the pulp instead of precipitating therein. Thus, the maintenance of low pitch and low iron may be simultaneously achieved.

Another application for the polyphosphates is in connection with the sodium or zinc hydrosulfite bleaching of groundwood. In this application, it is understood that the use of polyphosphates gives several points higher brightness readings.

Another application of the polyphosphates in bleaching is in connection with the calcium hypochlorite bleach of regular sulfite pulp. In this process, use has been made of the



The higher operating speed (600 rpm) of Roots-Connersville Paper Mill Pumps permits a drastic reduction in motor horsepower for a given capacity. That means lower first costs and long-time economy in power consumption.

In a typical case, motor size was reduced by 200 hp, with consequent reduction in power costs. That's the profit on a good many tons of paper.

Less water needed, less expensive foundations and less floor space bring additional dividends. Most important, the simple rotary positive design and sturdy construction of R-C Pumps result in proved reliability and low maintenance costs. The sum of these many dividends is the reason why so many paper manufacturers are turning to R-C equipment.

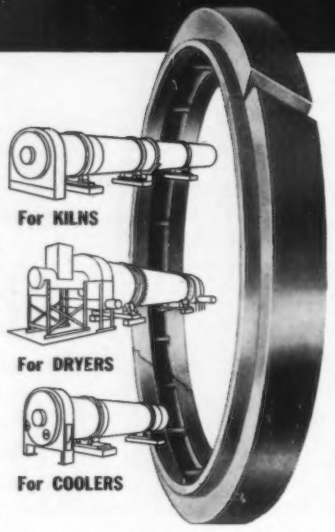
Ask for details in Bulletin 50-B-13 and consult us on your vacuum pump problems.

Roots-Connersville Blower Division
522 River Avenue • Connersville, Indiana

REG. U.S. PAT. OFF.
ROOTS-CONNERSVILLE BLOWER
BLOWER BUILDERS SINCE 1854
A DIVISION OF DRESSER INDUSTRIES, INC.

Reduce Production Losses

DUE TO DOWN TIME



GEARS • PINIONS • METAL TIRES • TRUNNIONS • SHEAVES • SPROCKETS • CRUSHER PARTS • RACKS AND PINIONS

CRANE WHEELS • SPINDLES • COUPLING BOXES • CRAB COUPLINGS • MILL PINIONS

REPLACE WORN OR CRACKED TIRES WITH

Stroh

DIAGONALLY CORED SPLIT TIRES

Stroh diagonally cored split tires can be installed on kilns, coolers or dryers in *as little as 36 hours*— including reaming of holes and riveting. No need to tear out sections or disturb shell alignment. Mating surfaces, welded after installation, cannot loosen under action of load or heat. Welded joints do not "hump" and roll smooth in operation.

Write today!

Stroh PROCESS STEEL CO.

Established 1916

PITTSBURGH 12, PENNA., U. S. A.

WALLACE YOUNG, South American Representative

Manufacturers of STROH ALLOY CAST TOOTH GEARS

CAST OR CUT TOOTH CARBON STEEL GEARS

polyphosphates to prevent the deposition of calcium scale in some of the intermediate wash steps.

Deflocculation of Clay

Improvements in the processing and preparation of clay or kaoline have resulted in its becoming one of the favorite materials for the production of high-finished coated papers. Here again, the polyphosphates have played an important role in the purification processes at the plants of the clay producers and in the application of the clay at the coating mills.

It was not until research discovered that the particle size of the clay had a marked effect upon the quality of the finish that real progress in this problem was shown. It is now quite well established that a good coating clay should have at least 80% of its particles less than 2 microns in diameter. Practically all of the particles should be smaller than 6 microns. With such specifications, a very finely divided material, the tonnage-production of which is a real accomplishment, is indicated.

Since the polyphosphates are very powerful dispersing agents or peptizers, they are of considerable value to the clay producers. They make possible the separation in water suspension of each tiny particle from its neighbor; and they permit the removal of the larger unwanted particles by levigation or centrifugal methods. With such perfect separation, de-colorizing operations are carried out with maximum efficiency.

Coating Slurries

The same mechanism of complete dispersion is of great value in the coating mill. While clay may be considered as an inert material, the behavior of clay from batch to batch is quite unpredictable. Some clay will contain minute quantities of such hard water elements as calcium, magnesium and iron salts. This characteristic brings the complex forming properties of the polyphosphates into play.

Practically all coating mills prepare their clay slips at one point and pump the slurry to the place of use. This procedure necessitates the use of an efficient and foolproof dispersing agent if high-ratio slips are to be transported. Experience has shown that the polyphosphates are the preferred dispersing agents for this service. They are effective in small quantities, and are not critical in the event an excessive amount is added accidentally.

Figure 4 depicts the drop in viscosity of a 55% solids clay slip as produced by sodium tripolyphosphate and tetrasodium pyrophosphate.

De-Inking

Tetrasodium pyrophosphate and sodium tripolyphosphate are useful additives in the de-inking and reworking of waste paper. These chemicals, due to their superior cleaning and dispersing properties, aid in the removal of pigments and inks. Gummy or resinous materials, such as are frequently found in certain types of waste paper, are prevented by additions of either of the phosphates to the pulper, from depositing upon the equipment. In many cases, the waste paper contains considerable amounts of clay. Here again, the clay dispersing properties of the polyphosphates makes it possible to wash out the clay with a minimum of manipulation.

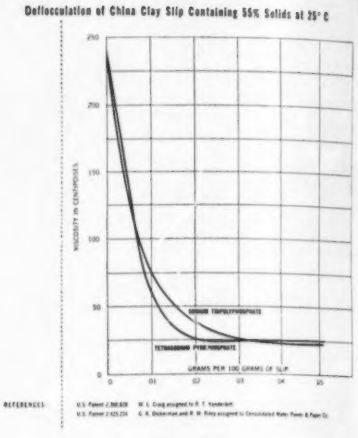


Figure 4

Felt Conditioning

The polyphosphates also are especially useful in the washing and reconditioning of paper machine felts. Highly alkaline detergents have several deleterious effects on any wool fabric. These impairments are shrinkage, weakening, matting with loss of absorbency, embrittlement and shortened life.

For successful detergency, a minimum pH of 9 is required. This figure is approximately the pH of neutral soap. Optimum pH for detergency is 10.4 to 10.6.

Liability to damage of wool rises quite rapidly above a pH of 10, especially at temperatures about 100° F.

The pH of a 1% solution of sodium tripolyphosphate is 9.6; that of tetrasodium pyrophosphate is 10.2; that of the common alkalies is well above 11.

Soaps are much more effective detergents than alkalies. One drawback to their use in felt washing, however, is that a felt cannot be washed free of them. Some of this remaining soap reacts with the hardness of the water to form insoluble calcium soap which reduces the absorbency of the felt. This action, of course, can be prevented by the use of polyphosphates. They not only prevent the precipitation of insoluble soaps, but redissolve those soaps already formed.

The sodium polyphosphates also have another useful property, as follows: where water has been softened by a cold process softener, precipitation of calcium carbonate may be incomplete

due to the slowness of crystallization. This condition will lead to after-deposition of calcium carbonate in the felt of a paper machine as well as elsewhere. However, this after-deposition can be prevented by the presence of a few parts per million of sodium tripolyphosphate to inhibit the crystallization. The same benefits are achieved where ground waters containing dissolved bicarbonates lose carbon dioxide and become supersaturated with calcium carbonates.

My remarks have cited only a few applications of the polyphosphates in the pulp and paper industry. Obviously, it is impossible for a chemical producer to know intimately all of the techniques and problems of the papermaker, so the list is hardly complete. However, it is hoped that this brief description of the phosphates will help to solve some of the problems in each of your own mills.

---

* Presented at the 33rd Annual Convention of The American Pulp and Paper Mill Superintendents Assn. in Detroit, Mich.

Sydney Ferguson

President, American Paper & Pulp Assn., tells Superintendents of

Management Problems in Paper Industry Today

Thinking over this subject, it occurred to me that these problems ordinarily, and fortunately, come up one at a time and we meet them as they arise. Very seldom do we sit down and consider the problems of the business as a whole. It may be argued, of course, that each decision is conditioned, subconsciously or otherwise, by one's overall viewpoint, temperament or frame of mind, but on the whole the day-to-day questions are promptly disposed of. Sufficient unto the day is the evil thereof.

There is, however, one occasion when we must take a broad outlook, a sort of comprehensive panorama, of the industry and of its place in our economy, and that is in contemplating the construction of a new mill.

Planning a new mill—or of any venture for that matter—becomes a simple matter if you have a crystal ball, or a corps of soothsayers to tell you whether the conditions are auspicious. Since such methods are somewhat outmoded, principally because they have been found to be unreliable, the next best way is the use of foresight. Foresight is a euphonious term meaning that actually serious consideration, in the light of previous knowledge and experience, has been given to *all* factors which go to make or break the success of the venture.

These factors which we must weigh carefully before we can proceed with the construction of a new mill may, in my judgment, be said to cover the "problems of Management in the paper industry" in a general way, and they are—

1. A supply of wood and other raw materials
2. Water
3. Labor
4. Taxes
5. Capital funds for building
6. The ability to operate at a profit
7. A good site

Our first consideration—a supply of wood and other raw materials. No one, obviously, would locate a wood-using mill in the middle of a desert. In order to make sure there will be adequate supplies of pulpwood—that these supplies will continue to be ample for many years—and that their initial cost plus delivery to the mill will be reasonable—surveys must be made and cruises conducted.

There remain today two great sources of wood in the United States—an area on the west coast and another in the south—and in both areas it must be remembered the paper industry is the youngest, the late-comer, among the users of forest resources. Lumber, plywood, naval stores, fence posts, railroad ties, even fuel, are still by far the causes of the greatest drain on the national supplies of wood, and of course we always have enormous losses from fire and insects. In the south, for example, some 25,000 saw mills consume approximately 27 million cords of pine timber annually — about 2½

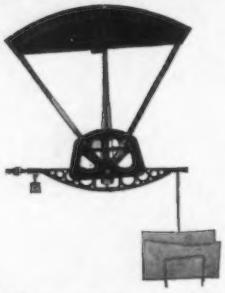
RESTIGOUCHE
BLEACHED SULPHITE PULP

for the manufacture of Cellophane, Rayon and Products of Paper

Restigouche
BLEACHED SULPHITE PULP

RESTIGOUCHE COMPANY, LTD.
Campbellton, N. B., Canada

THWING-ALBERT WALL TYPE BASIS WEIGHT SCALE



Indicates ream weight of paper from a single sheet. Scale ranges from 25 grams to 200 pounds. Features anti-friction bearings and truss beam construction. Dead beat motion allows minimum oscillating. Also available as a differential scale. Ideal for moisture content determinations.

THWING-ALBERT INSTRUMENT COMPANY
5366 Pulaski Avenue
Philadelphia 44, USA 104

PULP
PAPER

NORDICUS
INCORPORATED
500 FIFTH AVENUE
NEW YORK 36, N. Y.

SELLING AGENTS

times as much as is consumed by the pulp mills.

Expansion of the paper industry into the southern states is, as I intimated above, a comparatively new development, our hypothetical management years ago would have given no thought to locations other than in a strip well above the Mason-Dixon line. Quite the contrary nowadays. First consideration is given to areas which once were automatically disqualified on the basis of wood supply alone.

As you well know, it was principally the work of Dr. Herty of Atlanta which led to the discovery that southern pine could be made into pulp and paperboard, opening up this large field for the industry.

There is today another new source of wood supply which I would like to mention in passing. It might almost be said to be industry-created. Through research in the preparation and use of various woods certain species hitherto regarded as "weed" woods, have now become available for paper making, so that locations which up to now have had to haul their wood great distances can today, or shortly in the future, get supplies in a much more economical area and thus prolong the useful life of their properties very substantially. And this type of research is still being actively pursued.

Our second problem is that of water—water first for processing; secondly for transportation; and thirdly for removal of mill wastes.

Since the fibres at the head box of the paper or pulp machine constitute about one percent of the mixture flowing onto the wire, there must be a considerable and reliable source of comparatively pure water, even with all the save-alls and other equipment for the reuse of water.

While water transportation is, of course, tremendously desirable, both for the receipt of raw materials and for the shipment of finished products, it is not quite as important as it was in the past, due to the closer equalization of rail, truck and water-borne costs. Yet, with an annual freight bill of approximately $680 millions to the industry, this feature must not be overlooked.

More important in recent years from a water standpoint has been a method of disposing of waste water and its content of fibre, minerals and chemicals. There is hardly a section of the country where this is not a burning question. And I might add that the paper industry, because it is in almost every case the last to arrive on the scene, finds itself in the unenviable defensive position of being blamed for the condition of rivers and streams into which industrial and commercial wastes, as well as all other sorts of refuse and sewage, had been dumped lo these many years.

The various states have taken vigorous steps to police all factories, including those of our own industry, and as you men know, we have through the National Council for Stream Improvement spent thousands and thousands of dollars every year in order that every avenue will be explored to improve the condition of streams and rivers most economically. It has seemed to me that the public bodies whose functions include supervision of riparian rights are cooperating in a fine manner with those industries, like ours, who have sought to find a solution, and I feel sure that a solution will be found which, although it may not wholly satisfy the nature-lovers, will nevertheless permit plants to operate without too great a handicap.

Our third problem is labor. The pulp and paper industry is in my judgment particularly fortunate in that most of its operations are carried on in small communities, and its labor, especially its skilled labor, is of high caliber. Members of strong and sound unions for many years, paper makers are stable American citizens who for the most part own their own homes and have a strong stake in the welfare of their community and their nation. Such people can, of course, be found most anywhere in the United States, so that managements' problem here is merely to be sure that the labor force available for the new mill is adequate.

The burden of taxes today is everybody's problem—it is doubly so in the case of management. Industry's earnings are siphoned off at onerous rates, particularly for Federal taxes, and it is no exaggeration to say that in 1951 two dollars out of every three left after all other charges went for Federal and State governments.

This is indeed a real handicap. The remedy, of course, is to seek and seek vigorously a reduction of Federal expenditures and, in so doing, we must remember there are some things we would like to have that we will have to do without. We can't expect to have Federal taxes reduced if we rush down to Washington, hat in hand and yelling for help, at every turn in the business cycle.

Our fifth problem is to raise funds for the venture. In 1776 Adam Smith observed that money is always attracted to a profitable business and, conversely, it avoids an unprofitable business. Mr. Smith had, I imagine, no compunction in making such a statement nor did he offer any apologies. Lately, however, there has been a tendency to regard profit and the profit motive as shameful. Why I don't know. Winston Churchill put it this way, and I quote —"It is a socialist idea that making profits is a vice. I consider the real vice is making losses." Unquote. Certainly we cannot expect people to invest their money without reasonable prospect of a fair return because, in addition to intrusting the funds to us and permitting its use for all the expenditures connected with the venture, there is always the *risk* that it may not turn out a success.

Will the new venture be profitable? This problem, like all the others, is not as simple as it sounds. We must estimate what our product will cost, forgetting none of the items of construction, raw materials, labor, transportation, taxes, depreciation, depletion, interest, selling, administrative, etc., which go to make up that cost. Having done this we must have reasonable assurance that there will be a demand—note that word—for the product at a price which will cover the cost and leave a margin to pay the owners a fair return on their investment.

"Demand" as used here is a long-term, broad description of sellability—finding a market which the mill can logically supply at competitive prices. Sales departments must not only sell the output and help customers with their paper needs—if they are functioning 100% they will find new uses as well as new fields where paper and paper products can be sold. As mill men you probably feel very often that the easiest grades to sell are those which are the hardest for the mill to make; but I am sure that any well-managed sales organization always has in mind the capabilities and limitations of the operating department and is just as anxious to make a good showing.

And here I would like to speak of a related problem, connected with earnings—and that is, how much of such earnings, *after taxes,* shall be paid out to the shareholders?

I mentioned among the items of cost depreciation and depletion. Depletion is of course what the word implies—a using up of resources—and in the paper industry this means wood cut from timberlands and not replaced by growth. Depreciation in a broad sense is the deterioration which buildings, machinery, equipment, etc. undergo through age and wear and tear. For accounting purposes there is also a certain amount of obsolescence; that is, the value of equipment decreases or ceases altogether because of new methods or the introduction of faster and better machinery.

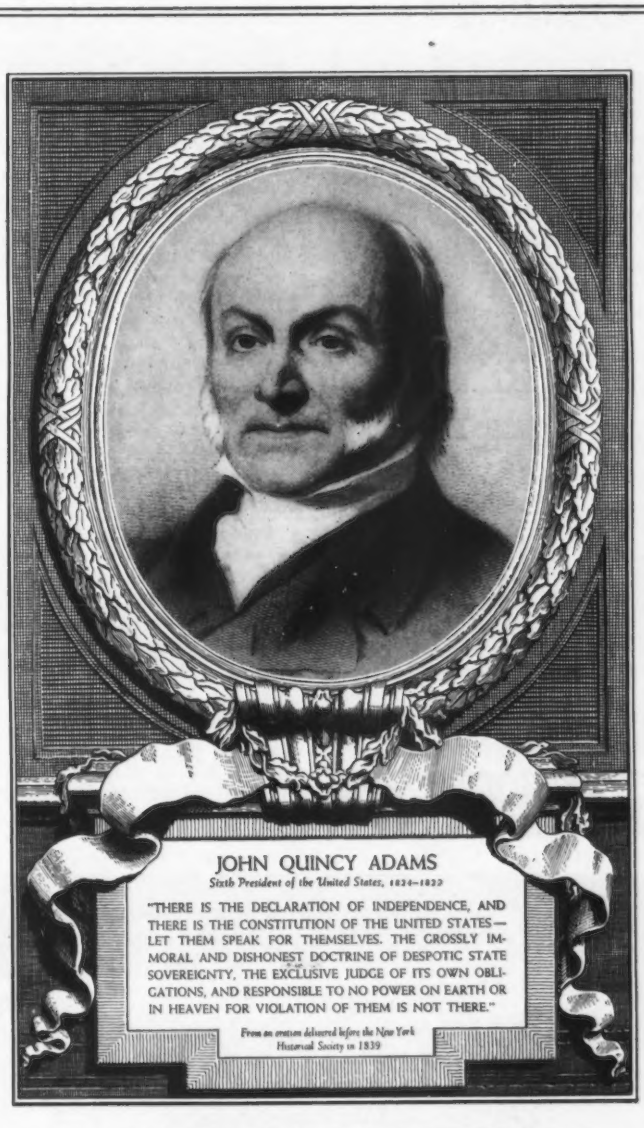
It might be presumed, therefore, that by putting aside the right amount of money at intervals we would have sufficient on hand to buy new machines as the old became no longer of use. But this is not so—for two reasons.

First, of course, is that you may only set aside the original cost and this amount is never enough to buy the same equipment years later. And secondly, the tax laws permit depreciation at rates and amounts that visualize a static industry—in short, not only are depreciation provisions inadequate to actually continue the enterprise as it stands but permits of no expansion or growth.

The result has been and is, of course, that the shareholder does not get what his stock earned after taxes—the net income of the business is not distributed to the owners but only a percentage thereof. In 1951 industry generally paid out in dividends approximately 52% of earnings after taxes and kept the balance "for use in the business." It is evident, therefore, that to have a "profitable" enterprise we must make profits, and indeed fairly good profits, in order simply to stay in business.

The seventh problem I have labeled "a good site." Picking a site obviously involves consideration of most of the other factors—taxes locally, labor supply, climate, wood supply in the vicinity, distance from markets, distance from other materials, water conditions, etc. It also has to do with the responsibilities management has towards its workers and towards the community in which those workers live. Is this site in or near a healthy, well-run community? Then its populace will be dependable, resourceful and competent people; it will be clean, attractive and law-abiding; it will have schools, churches, hospitals, good police and fire departments, playgrounds, parks and other means for recreation. Man does not live by bread alone, nor are the concerns of modern management confined to merely keeping the wheels of industry turning. As mill superintendents you men are closely familiar with the atmosphere which makes for *esprit de corps*—you realize full well how important are factors other than wages, hours of work, and fringe benefits, to the happiness and efficiency of personnel.

Perhaps you have felt that the problems I have discussed, while broad and


JOHN QUINCY ADAMS
Sixth President of the United States, 1824–1829
"THERE IS THE DECLARATION OF INDEPENDENCE, AND THERE IS THE CONSTITUTION OF THE UNITED STATES—LET THEM SPEAK FOR THEMSELVES. THE GROSSLY IMMORAL AND DISHONEST DOCTRINE OF DESPOTIC STATE SOVEREIGNTY, THE EXCLUSIVE JUDGE OF ITS OWN OBLIGATIONS, AND RESPONSIBLE TO NO POWER ON EARTH OR IN HEAVEN FOR VIOLATION OF THEM IS NOT THERE."
From an oration delivered before the New York Historical Society in 1839

HAVE FAITH IN AMERICAN PRINCIPLES

Draper Brothers Company
Canton, Massachusetts
WOOLEN MANUFACTURERS SINCE 1856

The DRAPER Fold

CHAS. T. MAIN, INC.
CONSULTING ENGINEERS
Process Studies, Design, Specifications and Engineering Supervision
PULP AND PAPER MILLS
Steam, Hydraulic and Electrical Engineering Reports, Consultation and Valuations
80 Federal Street Boston 10, Mass.

RODERICK O'DONOGHUE
CONSULTING ENGINEER
PULP MILLS — PAPER MILLS
IMPROVED PROCESSES—DESIGNS—REPORTS
420 Lexington Avenue
New York City 17

THE RUST ENGINEERING COMPANY
Engineers and Constructers
Pittsburgh, Pennsylvania
Complete Service for
PULP AND PAPER MILLS—PLANTS AND FACILITIES
DESIGN, CONSTRUCTION, MODERNIZATION

MISCO
STAINLESS STEEL CASTINGS
FOR ALL EQUIPMENT EXPOSED TO CORROSION BY SULPHITE ACIDS OR OTHER CORROSIVE AGENTS
MICHIGAN STEEL CASTING CO.
DETROIT 7, MICHIGAN

covering most if not all phases of the industry, did not touch upon the most important function of management. Each of the seven factors could be resolved, especially if it were isolated and without relation to any or all the others, by investigation and research of the engineering, the operating, the accounting, the sales, the personnel, the traffic, or other departments of the company. Management, of course, must be the judge to weigh all the findings and recommendations and boil them down into one plan before there can be unity and purpose.

But more than this, management's most important single responsibility is, in my judgment, to provide leadership. If a business were, as the legal fraternity sometimes describe it, merely a corporate entity with a term of existence but not life, this would not be so. On the contrary, a corporation is a group of human beings working together under the direction *and leadership* of the management, and if management is to fulfill its basic responsibility it must inspire the other members of the team with zeal, honesty, loyalty, and the will to win. It must create an atmosphere in which the organization will work harmoniously, intelligently, imaginatively and happily—in short, it must create morale. Here, in the field of human relationships, lies the acid test of good management.

A solid foundation must be laid on which to build a structure that will stand the strains and stresses of economic storm. This might seem academic, but there have been cases through the years where the importance of a proper foundation was not adequately recognized, and the results were anywheres from excessive costs to out-and-out disaster.

The problems of management in the paper industry are, as you can see, to get money to build mills to make pulp or paper from raw materials at such prices as will sell and make a profit over and above wages, materials, taxes and other costs, sufficient to pay the owners a return and still retain enough money to renew and enlarge existing equipment so as to make pulp or paper, etc., etc. In addition, and even more important, management must give and receive the confidence which comes from appreciation of jobs well done, must create a spirit of fellowship in a "going" concern.

As superintendents you men are in an excellent position to be of invaluable assistance in this respect. You work with and know the men in your mill; you live in the same community. Let me say a word at this point about the Community Relations Program which the American Paper and Pulp Association is conducting; you have undoubtedly seen the bulletins describing in terms that are readily understood the history and size of our industry and its place in the industrial family of America. May I emphasize the importance of this and all other association activities in bringing about an appreciation of how essential, how vital, paper is to the American economy.

Reverting to the role of the superintendent, he is, so to speak, able to see both ends of the parade. He can appreciate what management tries to do, and at the same time feel the hopes and aspirations of the rank and file. It might be said that effective management is in his hands because he is close enough to the bottom to know what is going on and close enough to the top to get something done about it.

The success of any organization, from a sandlot baseball team to a multi-million dollar corporation, depends upon each member pulling his weight in the boat, (and in the same direction), and this can only be brought about where management furnishes real leadership. It is an essential element of our American system of free enterprise that the leaders of today were the followers of yesterday, and this absence of water-tight compartments is in itself proof that the system is by long odds the best ever devised. Small wonder that because of it our people enjoy far greater well-being, freedom and security than anywhere else this side of heaven.

Presented at the Annual Meeting of the American Pulp and Paper Mill Superintendent's Assn., Detroit, Mich.

Ireland Constructs Pulp Mill

In an effort to start a paper-making industry from timber in the Republic of Ireland, Killeen Paper Mills will produce its first paper pulp this year.

Machinery has been imported from Sweden, Germany and Britain.

Cardboard and wrapping paper will be the first products. It is expected that 10,000 tons of timber will be treated every year.

Mr. George Munford, of Killeen Mills, who was responsible for the idea, says that the project is a commercial experiment, and that he thinks it will pay. A higher grade of paper will be produced when the forests of the Republic of Ireland come into commercial production.

Timber, from which the paper will be made, was formerly exported, mainly as pit props.

SPRACO BATTERY SPRAY MOISTENING EQUIPMENT
for the addition of moisture and chemicals
SPRAY ENGINEERING CO.
121 Central St., Somerville 45, Mass.
Write for new TECHNICAL BULLETIN

Importance of Liquid Volume and Liquor Concentration on Kraft Pulping*

R. H. Worrell
Southland Paper Mills, Inc.

The kraft pulp mill and bleach plant of Southland Paper Mills produces pulps for conversion into newsprint and high quality liner board of folding box grades. The chemical pulp requirement for newsprint is semi-bleached kraft at 65 percent G. E. brightness to the extent of 25 percent in the total furnish with groundwood making up the balance. The convenient package size for kraft pulp mills necessitated an over-design of the production capacity of the plant to produce this chemical pulp requirement. At the time the kraft pulp mill was started, its excess capacity was machine dried and sold on the open market. At the end of the war, the five-vat cylinder machine pulp dryer was converted into a paperboard machine to the extent that a high-grade product was being produced employing the use of unbleached, semi-bleached, and full bleached kraft pulp in its furnishes.

The evolution of presently manufactured products indicated the necessity of some compromise cooking procedures in the kraft pulp mill. As more and more kraft was being bleached, it became necessary to produce an easier bleaching pulp in the interest of economy of bleaching chemicals. At the same time, the cylinder machine had been most fortunate in having a pulp furnish which was very strong to help it obtain a good start in marketing the product. By definition, this strong pulp is one which is capable of absorbing extremely high power input from refining without radical freeness drops to appreciably slow up drainage rate on the machine.

This pulp is produced with a rather high active alkali concentration employing a total of 5300 pounds of active alkali and 950 cubic feet of total volume. The disadvantages of this low volume were reflected in poor liquor circulation, extreme variation in the uniformity of cooking from bottom to top, a high percentage of rejects, high chemical consumption in the bleach plant, and high per cent of color reversion of the bleached pulps.

It was decided that the investigation should be centered only around the effect of some changes in liquid volume and liquor concentration in the digesters.

For the purpose of this paper, liquid volume is defined as being the total cubic feet of white liquor plus the cubic feet of dilution, which in this case is black liquor, to comprise the term "total volume." The liquor concentration is defined as pounds of active alkali, which comprises all of the sodium hydroxide and sodium sulphide, expressed as Na_2O, per cubic foot of total volume added.

Whether it's entirely new or expansion and modernization of existing paper mill facilities, Ferguson is equipped to provide complete service, including preliminary studies, layouts, detail design and engineering . . . machine installation and construction.

Operating under one contract, Ferguson does the job faster and at less cost. The result—additional operating profits for owners.

THE H·K·FERGUSON COMPANY
ENGINEERS AND BUILDERS

EXECUTIVE OFFICES: Ferguson Building, Cleveland • NEW YORK OFFICE: 19 Rector Street
HOUSTON OFFICE: 821 Commerce Street • CHICAGO OFFICE: 1 N. LaSalle Building
LOS ANGELES OFFICE: 810 Title Guarantee Bldg. • CINCINNATI OFFICE: 31 E. 12th Street

PULP
PAPER

NORDICUS
INCORPORATED
500 FIFTH AVENUE
NEW YORK 36, N. Y.

SELLING
AGENTS

MERKOR
Non-Returnable, Durable standard mill core.

GARTEX
Returnable and Non-Returnable extra strong mill core for regular and special needs.

ANY LENGTH, DIAMETER AND THICKNESS

Write for samples and prices

MERCER
PAPER TUBE, INC.
655 WEST INGHAM AVE.
TRENTON, NEW JERSEY
NEW YORK OFFICE—500 5th AVE.

The mill is equipped with three stationary digesters of 2750 cubic fet capacity employing direct steaming, manual relieving, forced circulation from bottom to top, cooking at 100 pounds pressure at the corresponding steam temperature for a period of 2 to 2¼ hours to sample, which is normally 21 TAPPI permanganate number.

Several test cooks were loaded with given amounts of active alkali and total liquid volume and each one was designed to study the effect of these and to determine a compromise loading best suited for desired pulp qualities. To assist in presenting this discussion a tabulation is provided in order that the different loading schedules of the saven cooks might be observed. The discussion of each follows in the order of their entry.

Test No.	Active Alkali (A. A.) Pounds	White Liquor Volume Cu. Ft.	Black Liquor Volume Cu. Ft.	Total Volume Cu. Ft.	Conc. A. A. to Total Volume Lbs./Cu. Ft.
1	5,300	756	124	880	6.02
2	5,300	756	194	950	5.58
3	5,300	756	269	1025	5.16
4	5,300	756	344	1100	4.82
5	4,900	700	180	880	5.58
6	5,720	816	209	1025	5.58
7	6,120	874	226	1100	5.58

In cook No. 1, 5300 pounds active alkali and a total volume of 880 cubic feet was added, giving a concentration of 6.02 pounds per cubic foot. Samples taken from the blow line at 2, 5, and 8 minute intervals showed a permanganate range of 18-23 from bottom to top. Such a wide variation in permanganate range indicated that the digester was not cooked uniformly and although strength was maintained, this condition would be reflected in the cost of bleaching. This range was attributed to poor circulation from lack of sufficient liquid volume. The low total volume also was a contributing factor in that a high percentage of rejects was found.

In cook No. 2, a charge of 5300 pounds active alkali and a total volume of 950 cubic feet was added, giving a concentration of 5.58 pounds per cubic foot. This cook had been our established normal cooking practice. This digester charge produced a pulp of very good strength, but was not the uniform cook needed for easy bleaching. The results on blow line samples showed an improvement over the previous cook in that permanganate number variation indicated more uniformly. It was felt that the ultimate of uniformity by further dilution had not been gained.

In cook No. 3, 5300 pounds of active alkali and a total volume of 1025 cubic feet was added, giving a concentration of 5.16 pounds per cubic foot. The degree of cooking was relatively uniform from top to bottom with some possible drop in pulp strength. It was noted that a peak load was possible on the circulating pump throughout the cook, relieving was good and less rejects were found. From the standpoint of liquid and liquor concentration, it was felt that this cook came close to meeting all the requirements for mill scale operation.

In cook No. 4, 5300 pounds active alkali and a total volume of 1100 cubic feet was added, which resulted in a concentration of 4.82 pounds per cubic foot. This cook showed good uniformity at a further sacrifice in strength, and was darker in color and cooked somewhat slower. Several facts developed which indicated that the limitation had been reached in increasing total volume. This cook did not relieve well, making it necessary to cut down on the volume of liquor circulating from the bottom to the top of the digester.

The preceding cooks were run to determine the effect of increasing liquid volume and correspondingly decreasing liquor concentrations on kraft pulping. Pulping with decreased concentration and high liquid volume produced a pulp which was the exact opposite of the earlier mentioned strong pulp. Pulp produced under these conditions developed very rapidly upon refining, to the extent that with low power input the freeness showed big drops with rapidly developing mullen characteristics.

Cooks No. 5, 6, and 7 were run to determine the effect of different volumes with white liquor concentration remaining constant. In these cooks a concentration of 5.58 pounds per cubic foot was selected, based on the previous experience with Cook No. 2, which had produced a very strong pulp over a prolonged period. The procedure was changed by keeping the active alkali concentration constant by varying both active alkali added and total volume added.

In Cook No. 5, 4900 pounds active alkali and 880 cubic feet total volume was added, giving a concetration of 5.58 pounds per cubic foot. As in Cook No. 1, the permanganate range varied in the same order and a strong pulp was produced.

In cook No. 6, 5720 pounds of active alkali was used and a total volume of 1025 cubic feet was added, the concentration remaining fixed at 5.58 pounds per cubic foot. This cook produced a uniform pulp with good strength. In this case, the same total volume was added as in Cook No. 3, but the active alkali concentration was set at a figure above the convenient

liquor producing capacity for day by day operation.

A further step was taken in Cook No. 7, using 6120 pounds active alkali, increasing total volume to 1100 cubic feet and maintaining active alkali concentration at 5.58 pounds per cubic foot. This cook produced a pulp of uniform quality and good strength, also of a much lighter color. In this case, the problem of economy and producing capacity in operation was obvious.

In the first four cooks, the first conclusion is that low volume is to be excluded because there is not enough dilution to insure uniform cooking although the higher concentration produces a very strong pulp. The second conclusion is that high volume with low concentration of active alkali produces a weak pulp. The third conclusion is that by increasing total volume and maintaining concentration of active alkali to the reasonable limitation of capacity and economy, the qualities of strength, uniformity and bleachability can be maintained.

In summarizing, the conditions brought about by the necessity for an easy bleaching pulp made this investigation of liquid volume and liquor concentration of utmost importance. As previously mentioned, our normal operational level was at 5300 pounds total active alkali and 950 pounds cubic feet total volume, giving a concentration of active alkali at 5.58 pounds per cubic foot. This cooking charge produced a very strong pulp. Therefore, these manipulations involving changes in liquid volume and liquor concentration were made to ascertain their effect on pulp strength, uniformity, and bleachibility. The liquor producing equipment was not sufficient to provide more than 5300 pounds active alkali per cook. This led to the use of increased total volume whereby maximum uniformity could be obtained with a minimum sacrifice in strength by further dilution of the active alkali.

From the results of these cooks, a compromise digester liquor charge, based on Cook No. 3, was effected at a total liquod volume and white liquor concentration that would meet the convenient requirements of the mill conditions. Sufficient proof was shown that in this charge improved bleachibility could be obtained while at the same time retaining sufficient strength.

* Presented at the 33rd Annual Convention of The American Pulp and Paper Mill Superintendents Association in Detroit, Mich.

NEWS FROM ENGLAND

At the invitation of the British Government, Swedish pulp suppliers met British paper and board makers in London on June 4th to discuss third quarter prices and supplies. This in effect, was a "face saving" move by the British Government who came in for severe criticism when they imposed their ceiling prices for the second quarter, and the object of the meeting was to give the Scandinavians a chance of discussing prices before using the more drastic method of imposing ceiling prices again.

The Swedish suppliers suggested £71 ($198.09) for bleached sulfite, £60 ($167.4) for strong sulfite, £58 ($161.73) for kraft and £35 ($97.65) per dry ton of mechanical pulp. Prices the British thought more in line, were: £65 ($181.35) bleached sulfite, £56 ($156.24) strong sulfite, and £30 ($83.9) for mechanical.

The following Monday the Swedish party attended a conference in Stockholm. If no agreement is reached over the prices, arrangements will be left to the individual pulp mills and their customers. It appears certain, however, that although the Swedes have offered wood pulp at prices which are low enough to abolish the Swede's business equalization charge, the British Government will again impose a ceiling price for the next quarter's deliveries.

* * * *

It has been announced by the Ministry of Materials that ceiling prices on the importation of wood pulp are to be maintained during the third quarter but with some reductions. Bleached sulfite is to be £74 ($206.4), bleached sulfate and soda pulp £74-16-0 ($208.4), kraft £60 ($167.4) and mechanical £37-10-0 ($104.62)—all per air dry ton. It is expected that these ceiling prices will continue during the fourth quarter as well. It should be noted that they are *above* the prices quoted by the Swedes and would only have value in the event of sudden price increases.

White Bag Co. Expands

SPARTANBURG, S. C.—White Bag Co. is well under way on construction of a new warehouse which will double the firm's present facilities.

When completed, the new addition will be used partially as a warehouse. It will enable the company to install new machinery.

One of the new machines already ordered is a four-color anilox press costing $35,000.

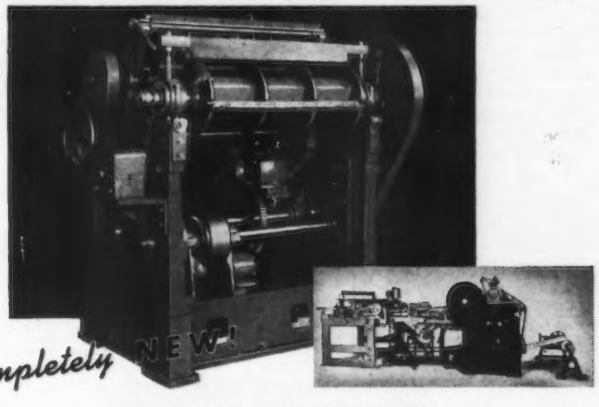
The majority of bags produced at the White plant are made for meal and flour. However, the company also turns out specialty bags along with other types of feed bags.

Increase Canadian Newsprint Production

Canadian production of newsprint in 1951 was 5,516,279 tons or an increase of 238,000 tons over the preceding year, according to the Newsprint Assn. of Canada. This marks the largest annual increase in production since 1927 when the initial post-war recovery after wartime curtailments was recorded.

Shipments in 1951 to the United States were 4,783,549 tons, a gain of 35,000 tons or 7 percent compared with the previous year. United States consumption in 1951 of 5,974,865 tons was about 38,000 tons or 6 percent higher than that of the previous year.

FOR SPOT CUTTING PRE-PRINTED ROLLS



SMITH & WINCHESTER
ROTARY SPOT CUTTER

For precision register and accurate spot cutting of pre-printed traveling webs at a high rate of production. This high speed rotary cutter can be equipped with photo-electric compensator or may be manually controlled. Save time, eliminate waste and increase production with this modern S & W equipment. Built in 40", 50", 60", 71" and 83" widths. May be furnished with lay boy and stacker as illustrated. *Write for detailed information!*

THE SMITH & WINCHESTER MFG. CO.
SOUTH WINDHAM, CONNECTICUT
Paper and Paper Bag Machinery Since 1828

MEXICAN NEWS

The newsprint situation in Mexico has eased as further Canadian shipments continue to reach the port of Veracruz. The *SS Ryvarden* docked with 8,168 rolls of paper, or 3000 tons, from Canada; and the *Moby Dick* with a consignment of 822 rolls, or 250 tons, from the United States. In the last fifteen days four ships have arrived with newsprint and Mexico City papers are once more putting out normal editions.

In well informed circles it is said that paper quotas for the month of June are fully covered and there is even a surplus for July. Too, within 20 days the *SS Sun Valley* is expected to arrive with 4,000 rolls, while two ships of the Western Steamship Line are to bring 3,000 tons of paper contracted for by Mexico in New York, and which will be shipped from New Orleans.

* * *

One of the largest sulphur refineries in Mexico is to go up in San Cristóbal, in the state of Veracruz and large quantities of machinery and other material has already passed through Minatitlan for the construction site. According to information released by field engineers, 20 wells have been located but only four have been registered for exploitation. The operation, involving "several million pesos" is full-scale; machinery acquired is of latest type, and in addition to dock facilities the new plant will own freighters, planes and helicopters for shipment of sulphur.

* * *

The problem of paper shortages in Mexico may be further eased by a new cellulose plant which is to be erected in the timber area of the state of Durango at a cost of 100 million pesos ($11,574,000). Associated in the enterprise will be Snaia Viscosa of Italy, which is putting up 25 percent of the capital with other money coming from private investors and a 40 million pesos ($4,629,740) loan granted by Nacional Financiera (semi-official government finance agency).

The new plant will produce cellulose for newsprint but, according to information released by the National Chamber of the Mexican Paper Industry, the production will only satisfy part of the nation's need for newsprint and heavy imports will still be required.

The Italian firm recently invested in a huge cellulose plant to be erected in Chihuahua, but unfortunately at this location cellulose extracted from timber would not serve for newsprint. The Government as well as the paper industry's trade association are keenly interested in moves to produce paper in Mexico for there is a possibility that Mexico may before long be faced with the same serious problem as Argentina and other Latin American countries where paper shortages have drastically reduced size of newspapers. The Government is offering every aid for any project which might conceivably increase national paper production.

Ireland's Imports

In March, 1952, the Republic of Ireland imported paper and cardboard to a total value of £1,071,796, of which £225,673 worth came from Great Britain. These imports brought the total value to £2,743,254 for the first three months of 1952, of which £747,-999 worth came from Great Britain.

In March no mechanical wood pulp was imported, leaving a total of these imports for the first three months of the year at 74 tons, valued at £8,515, none of which came from Great Britain.

There were imports of chemical wood pulp in March, 1952 of 43,266 cwt., valued at £261,434, none of which came from Great Britain.

The total imports of chemical wood pulp in the first quarter of 1952 amounted to 82,886 cwt., valued at £498,648, none of which came from Great Britain.

Imports of other pulp and waste paper during March, 1952, amounted to 500 cwt., valued at £2,510, making a total of 8,112 cwt., valued at £45,254 for the first three months of 1952. None of these came from Great Britain.

Coated printing paper, amounting to 4,668 cwt., and valued at £38,943 of which 3,148 cwt., valued at £26,794 came from Great Britain, was imported in March, 1952, making the otal of such imports for the first three months of 1952 12,554 cwt. valued at £106,362, of which 8,997 cwt. valued at £72,533, came from Great Britain.

Newsprint imports were 77,476 cwt., valued at £278,664 in March, 1952: of these 459 cwt., valued at £1,777 came from Great Britain. The total newsprint imports for the first three months of 1952 was 210,050 cwt., valued at £673,797 of which 7,161 cwt., valued at £25,928 came from Great Britain.

Other uncoated printing paper imported in March, 1952 amounted to 3,066 cwt., valued at £27,671, of which 2,140 cwt., valued at £20,866 came from Great Britain. The total of these imports in the first three months of 1952 was 9,931 cwt., valued at £82,632 of which 6,860 cwt., valued at £58,003 came from Great Britain.

Of the March newsprint imports 15,-714 cwt., valued at £43,535 came from Canada; 21,712 cwt., valued at £82,735, from Finland; and 39,591 cwt., valued at £150,617 from Sweden. The quarterly totals of imports of newsprint from those sources were: Canada, 107,-016 cwt., valued at £288,208; Finland, 48,557 cwt., valued at £179,643; Sweden, 46,582 cwt., valued at £176,-944.

Principal sources of supply of paper board imports (excluding corrugated or building board) in March included: Norway, 4,497 cwt., valued at £27,717 (quarterly total: 6,441 cwt., valued at £39,739; The Netherlands, 13,921 cwt., valued at £25,404 (quarterly total; 43,-799 cwt., valued at £87,604 (quarterly total 29,399 cwt., valued at £165,151); Finland, 9,338 cwt., valued at £39,402 (quarterly total 16,174 cwt., valued at £73,463); Canada, 6,296 cwt., valued

AMERICAN PULP AND PAPER ASSOCIATION'S PAPER PRODUCTION RATIO REPORT

(Production as per cent of normal capacity)

COMPARATIVE WEEKLY SUMMARIES

	May 17	May 24	May 31	June 7	June 14
1952	90.2	90.7	84.9	88.6r	90.3
	May 19	May 26	June 2	June 9	June 16
1951	102.9	103.6	99.6	103.4	101.3

COMPARATIVE MONTHLY SUMMARIES

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year Avg.
1951	99.3	101.3	101.9	102.8	102.2	100.1	88.6	97.7	94.3	100.3	98.0	90.0	98.0
1952	97.1	97.9‡	96.1‡	91.4‡	89.4‡								

COMPARATIVE YEARLY SUMMARIES

	1945	1946	1947	1948	1949	1950	1951	1952
Year to Date	88.9	100.4	105.5	99.9	88.1	95.6	101.8	94.0
Year Average	85.4	96.9	101.7	92.1	83.7	95.8	98.0	

‡ Preliminary.
r Revised.

PAPERBOARD OPERATING RATIOS†

	May 17	May 24	May 31	June 7	June 14
1952	83	83	79	75	86
	May 19	May 26	June 2	June 9	June 16
1951	106	102	100	102	103

Year	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year Avg.
1951	102	105	104	105	104	103	84	94	86	87	82	75	94
1952	81	86	85	82	82								

All of the above data is based on tonnage reported to American Paper and Pulp Association. Does not include mills reporting to National Paperboard Association, except in isolated cases where both paper and paperboard are produced and separate tonnage figures are not readily available. Does not include mills producing newsprint exclusively.

Note: In the above tables all the ratios shown are on the basis of a normal 6 and 7 day capacity.

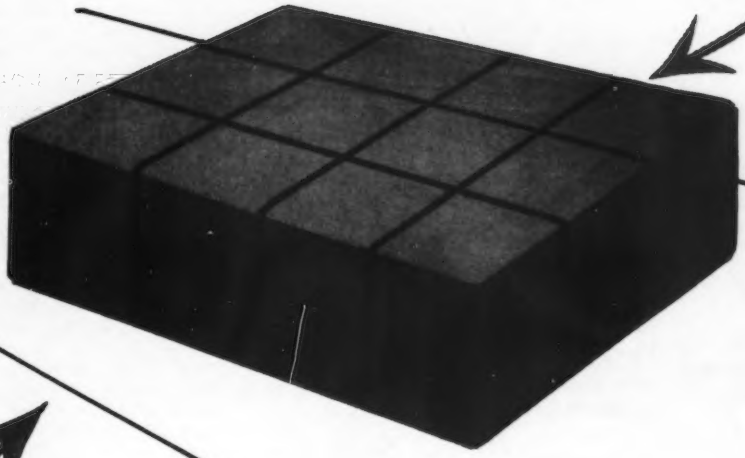
† Per cents of operation based on "Inch-Hours" reported on a 6-day basis to the National Paperboard Association.

Lyddon & Co.

exporters of wood pulp
to all world markets

Parsons & Whittemore

paper exporters
wood pulp



London

Paris Zurich

Stockholm Oslo

Sousse Montreal

Buenos Aires Sao Paulo

10 East 40th Street, New York 16, N. Y.

Waste Paper
We are always in the market for combination truckloads or carloads of high grades and specialties
PIONEER PAPER STOCK COMPANY

at £19,651 (quarterly total, 22,273 cwt., valued at £73,557).

Exports of paper and cardboard (including paper-making materials) in March, 1952, were valued at £150,186 of which £129,336 went to Great Britain.

Total exports for the first three months of 1952 were valued at £483,780 of which £412,033 went to Great Britain. Made-up articles, not printed, constitued about one third of the total exports, and Great Britain bought most of the cardboard.

Domestic Newsprint Consumption

Daily newspapers reporting to the American Newspaper Publishers Association consumed 404,071 tons of newsprint in May, 1952 compared with 403,233 tons in May, 1951 and 401,922 tons in May, 1950. This was an increase over May, 1951 of 0.2% and an increase over May, 1950 of 0.5%. There were four Sundays each in May 1952, 1951 and 1950.

Stocks of newsprint on hand and in transit at the end of May, 1952 were 40 days supply for the average of all daily newspapers reporting to the ANPA. This is a decrease of 1 day's supply as compared with the end of April, 1952. There were 32 days supply at the end of May, 1951.

The total estimated newsprint consumption in the United States for May, 1952 was 538,761 tons which includes all kinds of uses of newsprint. For the first five months of 1952 it is estimated at 2,520,992 tons. For the first five months of 1952 the reporting newspapers used 1,890,744 tons of newsprint, an increase of 0.01% over the first five months of 1951 and an increase of 0.5% over the first five months of 1950.

Customs Court Cases

Seven shipments of kraft wrapping paper at Philadelphia and three of kraft wrapping, as well as one of greaseproof paper, at New York, all from Finland, have been held by Customs officials to have been undervalued and importers have asked Court review of these rulings according to Warren B. Bullock, Manager of the Import Committee of the American Paper Industry.

New problems under consideration by Customs officials include the following: Paper from Newfoundland claimed to be duty free as paper stock being narrow width side runs, believed to be dutiable as printing paper because not so mutilated as to be unusable as paper; paper from Germany entered at low rate fro drawing paper, believed to be properly dutiable as bristol; carbonized paper, over 10 pound basis weight, claimed to be dutiable as carbon paper at 1¼ cent per pound and 3¾ percent, believed to be outside the weight limit for such a classification, and dutiable as coated paper at higher rate; paper with colored surface liner and white base, described as elephant hide, imported from England, under investigation to determine whether it is laminated or coated; nine-point kraft from Sweden claimed to be dutiable at 10 percent as kraft paper, believed to be dutiable at 30 percent as paper not specially provided for; toweling in 250-foot rolls claimed to be dutiable as paper cut into shape, believed to be dutiable at higher rate as machine-creped paper.

Seek True Timber Tales

The lumberjack is rapidly becoming the new star of America's folklore and history.

Writers and historians are showing live interest in American forest history. To meet this growing demand for factual information a national Forest Products History Foundation has been set up in Saint Paul, Minn., at the Minnesota Historical Society.

Veterans of the woods are urged to jot down their memories, round up old letters and pictures, salvage every possible scrap of information which will contribute to preserving the true story of the American forest. Writers are especially eager to have more facts about the colorful "characters" of the forest products industry, how they lived, worked, played, fought and died.

The aim of the Forest Products History Foundation is to permanently preserve the true story of the American forest and to make it known to all Americans. To do that it must depend in large measure upon primary historical materials which can be provided only by the men who have been a vital part of America's forest history. Your contribution of information, notebooks, diaries, journals, pictures, and other historically valuable materials are welcomed. Send all such materials postpaid to the Forest Products History Foundation, Minnesota Historical Society Building, Saint Paul 1, Minn.

OBITUARIES

Lawrence M. Weil, 58, owner of the Electric City Box Co. and Art Containers, Inc., Buffalo, N. Y., paper box manufacturers, died June 17 in a Buffalo hospital after a brief illness.

Mr. Weil was active in national trade organizations, the Buffalo Chamber of Commerce and the Buffalo Advertising Club.

Herman C. Orchard, 61, president and founder of the Orchard Paper Co., died June 21 of a heart attack in Barnes Hospital.

Philip J. Galmbacher, 56, general manager of the Great Lakes Paper Stock Co., died June 19.

Mr. Galmbacher entered the employ of the paper stock company as an office boy. He had been general manager of the firm for the last five years.

NORTON

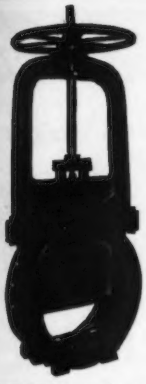
Grinding Wheels
Pulpstones • Refractories
Grinding Machines
Porous Mediums
Non-slip Tiles &
Aggregates
Norbide Products

NORTON COMPANY
WORCESTER, MASS.

THE CARTHAGE MACHINE COMPANY
CARTHAGE, NEW YORK

Manufacturer of

Machinery and equipment for Mechanical and Chemical Pulp Mills and Special Machinery



RECORD PAPER & PULP STOCK VALVES "BONNETLESS SELF CLEARING - - - "RESIDUE POCKETLESS TYPE"

METALS — I.B.B.M., all iron, bronze or stainless steels, body parts plain or rubber lined.

The photo of 24" Fig. 241 I. B. B. M. valve while illustrating the gate bottom wedge system for forced gate seating and "GUILLOTINE" edge for shearing fibre at seat also shows the packing box and yoke as separate units. Both adjustable.

- The "FAST THREADED" screw stem and ball bearing speeds valve operation.
- The packing box is extra deep, is adjustable and provided with specialized lubricated packings and special type gland and compression bolts.
- The yoke mountings are such that yokes for various methods of gate operation are interchangeable.
- Replaceable gate edge shoes are used in valves 10" and larger. These shoes are of special value when valves are installed stem and pipe horizontal.

"RECORD PRODUCTS EXTENSIVELY USED IN DEFENSE PROJECTS"

RECORD FOUNDRY & MACHINE COMPANY

LIVERMORE FALLS, MAINE, U. S. A.

WILLIAMS-GRAY CO.

221 North La Salle Street
Chicago 1, Illinois

Paul Foster
Barney Benson
Peter Talbot
Ross Lawrence
Herb. Fishburn

Lindsay & Niagara Wires
Knox "Excelsior" Felts
Siamese & Richland Dryer Felts
Carrier Rope
Splicing Tissues
Deckle Webbing
Etc.

Look to the Source!

WHEN YOU USE SODIUM CHLORATE FROM OLDBURY . . . you may rely upon the reputation of your source of supply as absolute assurance of the product *quality* and *uniformity* that you must have to maintain and advance your own product standards and customer services.

OLDBURY

ELECTRO-CHEMICAL COMPANY

Plant and Main Office:
NIAGARA FALLS, NEW YORK

New York Office:
19 RECTOR STREET, NEW YORK 6, N.Y.

Supplying Your Requirements

AMERICA'S LEADING INDEPENDENT WASTE PAPER PACKERS

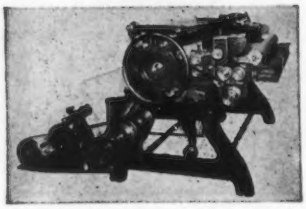
WASHINGTON, D. C.
PHILADELPHIA, PA.
NEW YORK, N. Y.
MINNEAPOLIS, MINN.

THOMAS PAPER STOCK COMPANY
1500 No. Hooker Street • Chicago 22, Ill.

STANDARD & FACIAL TISSUE ROLL CONVERTERS

WITH OR WITHOUT

Latest Improvements: Parent Roll Drive with Automatic Tensioning — Velvet Smooth, Quick Accelerating Clutch



Slitters and Rewinders for Vulcanized Fibre and Heavy Board

•

Towel Interfolders for single interfold

•

Special Machinery

Rotary Card Cutters

•

Spiral Tube Machines for Toilet Roll Cores

•

Designing

DIETZ MACHINE WORKS

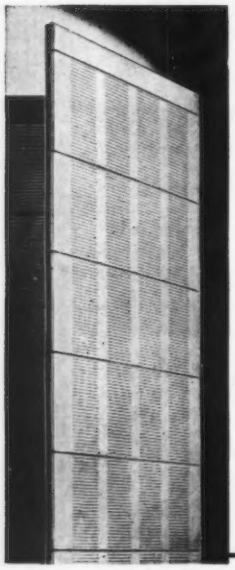
Factory-Office: 126 W. Fontaine St.

SINCE 1901 **PHILADELPHIA 22, PA., U. S. A.**

MAGNUS-MADE

FABRICATED SCREEN PLATES

for High Plate Capacity—Long Plate Life



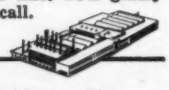
"Hardy" fabricated screen plates, made by Magnus of chrome-nickel-steel or inconel, have a high-strength, thin sheet design that's specially engineered for *maximum flow*. About 40,000 of these plates are now in service, with performance records that prove these three important advantages:

1. **Increased Plate Capacity.** The thin sheet eliminates relief milling, and with recommended arrangement, substantially increases capacity per plate.

2. **Longer Life.** Slots remain sharp, side walls highly polished for the life of the plate. There's greatly improved corrosion resistance, too.

3. **High, Sustained Yield.** Fabricated screen plates assure consistent, uniform quantities of cleaner pulp. This means improved production at reduced operating costs.

Complete information is yours on request. Or if you like, we'll gladly have an engineer call.



MAGNUS METAL CORPORATION, *Fitchburg, Mass.*

Metalworkers for the Paper Trade

SCREEN PLATES: BRONZE, CHROME-NICKEL-STEEL, AND INCONEL
VALVES: GATE, SWING CHECK, BLOW, GLOBE, ANGLE AND "Y"

WEST VIRGINIA PULP and PAPER COMPANY

230 Park Ave.
New York 17, N. Y.

35 East Wacker Drive
Chicago 1, Ill.

503 Market St.
San Francisco 5, Calif.

Manufacturers of West Virginia Mill Brand Papers

SUPERCALENDERED
ENGLISH FINISH
LITHOGRAPH
LABEL
OFFSET
EGGSHELL
MUSIC
POSTER
BOND
WRITING
ENVELOPE
MIMEOGRAPH
INDEX BRISTOL
POST CARD
COVER
CUP AND CONTAINER
FILE FOLDER
COATED
MACHINE COATED

KRAFT LINER BOARD
KRAFT CONVERTING AND KRAFT ENVELOPE

MILLS

Mechanicville, New York
Luke, Maryland
Covington, Virginia
Tyrone, Pennsylvania
Williamsburg, Pennsylvania
Charleston, South Carolina

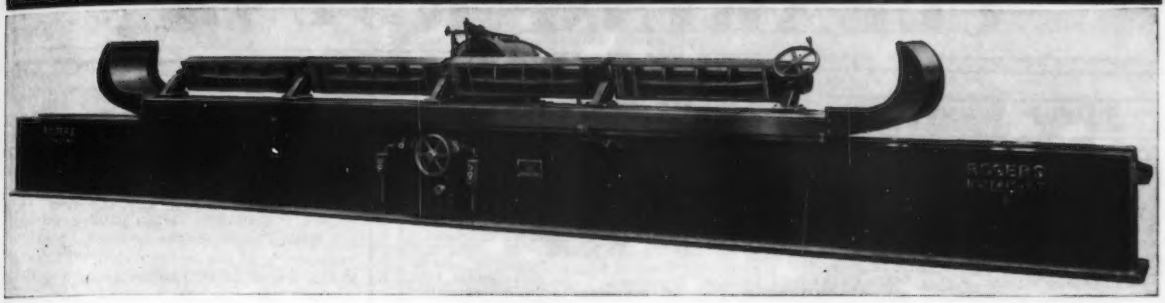
"EXCELSIOR" FELTS

The Trademark of Felts of Superior Quality for Every Grade of Pulp and Paper

KNOX WOOLEN COMPANY

CAMDEN, MAINE

ROGERS . . . Series 220 . . . MASSIVE Paper Knife Grinder



Cut Chipper Grinding Time in Half . . . . with this unique Rogers device.

Only on the massive Series 220 can this latest Rogers development be used. Chipper knives can be placed 2 high so you double production at no additional cost when you use the Series 220.

Series 220 is a powerful new design for high production and fast grinding of all heavy-duty straight knives. The model above takes a knife up to 200" long. The cabinet base is 30' long and it weighs over 10 tons. Many exclusive Rogers features are included. Write for bulletin 220.

ROGERS CC-3 FAST SLITTER GRINDER

The CC-3 is the only machine of its kind made to grind all types of circular knives and both top and bottom slitters with diameters of 2" to 20". Knife life can be increased by as much as 30% . . . and savings therefore made on fewer knife replacements. A magnetic chuck can be supplied to speed set-up time. Keep your knives and slitters in their original fine cutting condition . . . send for further information.

SAMUEL C. ROGERS & COMPANY KNIFE & SAW GRINDING EQUIPMENT SINCE 1887
171 DUTTON AVENUE, BUFFALO, N. Y.

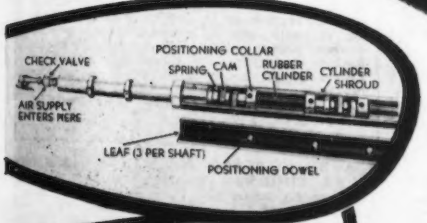
ELIMINATE LOSS OF TIME and DAMAGE TO PAPER with NEW! Murco-Collard

PNEUMATIC COLLAPSIBLE WINDER AND UNWINDER SHAFTS

Made in diameters and lengths practical for most mill operations.

MURCO

Pat. No. 2,520,126



Check THESE FEATURES

- Adaptable either for winding or unwinding paper without mandrels, chucks, collars, keys, wedges or other accessories commonly used for these operations.
- Simple, rugged construction . . . few parts subject to wear.

Shaft expands instantly by applying air supply nozzle to air inlet valve. Outside expands to a true circle that provides complete contact with core or paper throughout the entire length of shaft . . . no slippage . . . no damage to paper or core . . . easily placed in position. Collapsing is done by a touch of the finger to release valve.

Send us your specifications for recommendations and complete proposals.

D. J. MURRAY MANUFACTURING CO. WAUSAU, WIS.
MANUFACTURERS SINCE 1883

CLEARING HOUSE

HELP WANTED

MEN WANTED—POSITIONS OPEN

We can place—Manager large specialty paper mill; supt. kraft specialty papers; asst. supt. Fourdrinier mach. lightweight specialty papers; asst. supt. paper converting, printing and packaging; asst. mgr. of mfg. large paper and pulp mills; asst. supt. cylinder mach. roofing felt mill.

Chemists, chem. engineers and laboratory men for paper mills also for demonstrating and selling; salesman for napkins, cups, mats and paper specialties; salesman for newsprint.

Master Mechanics, plant engineers, mech. engineers, designers and draftsmen, salaries ranging from $6,000 to $12,000 yr.; Fourdrinier and Cylinder mach. foremen; finishing foremen; beater engineers; machine tenders and back tenders.

LIST YOUR CONFIDENTIAL APPLICATION WITH US to keep informed of attractive positions open in the pulp and paper mills.

CHARLES P. RAYMOND SERVICE, Inc.
294 Washington St., Boston 8, Mass.
Telephone Liberty 2-6457

SPECIALISTS IN PLACING AND IN SUPPLYING PULP AND PAPER MILL EXECUTIVES

J-27

MACHINE TENDER WANTED

Need qualified man for six cylinder board machine making high grade folding boxboard.

If you are available write or phone giving details of your experience, education and background to—

ROBERTSON PAPER BOX CO., INC.
Montville, Connecticut

J-4

PURCHASING AGENT

To organize Purchasing Department for new mill. Experienced in buying of major equipment and supplies for pulp and paper production. Spare parts and mill stores warehousing experience desirable. Summarize work history. Box 52-275, Paper Trade Journal. J-27

SUPERINTENDENT—Experienced man for Facial Tissue Machine. Beater Roll preparation essential. State qualifications and salary. Address Box 52-269 care Paper Trade Journal. J-27

SALESMAN for Paper Mill Sales Office in New York City; experienced preferred. State full details and salary desired. Address Box 52-261 care Paper Trade Journal. J1-4

HELP WANTED

PLANT ENGINEER

To coordinate activities of design engineering firm and contractors during construction. Direct all engineering and maintenance in completed mill. Should have not less than ten years experience in pulp and paper mill maintenance. Experience in maintenance of sulphate pulp production facilities necessary. Familiarity with groundwood and newsprint production desirable. Summarize experience. Box 52-274, Paper Trade Journal. J-27

HELP WANTED

Starting our second machine. Need Machine Tenders, Back Tenders, Third Hands, and Beater Engineers. One straight Fourdrinier and One Yankee Fourdrinier. Manufacturing Wrappings, Specialties, Corrugating Medium, and Light Weight Chip. Best of Labor Relations, Insurance, and Liberal Pension Plan. Mill Located about 40 miles from Chicago, Ill.

PRAIRIE STATE PAPER MILLS
JOLIET, ILLINOIS PHONE 3-3441 OR WRITE
TF

SMALL BAG MACHINE ADJUSTERS

A fine opportunity for experienced men on either sacks or automatics. Steady employment, many employee benefits. Philadelphia. Reply fully. Confidential. Address Box 52-243, care of Paper Trade Journal. J-27

SALARIED POSITIONS $3,500 to $35,000. We offer the original personal employment service (established 42 years). Procedure of highest ethical standards is individualized to your personal requirements. Identity covered; present position protected. Ask for particulars. R. W. BIXBY, INC. —117 Dun Bldg., Buffalo, 2, N. Y.

J-27

PAPER CHEMIST for research and development work in our central research laboratories. Prefer Ph.D. with several years' experience in the paper industry. Excellent opportunity for man able to assume responsibility for important development work. Please send resume to Employment Office, American Cyanamid Company, Stamford, Conn. J-27

WANTED—Assistant Millwright or assistant master mechanic, willing to work, in one-machine Board Mill. Company steadily growing. Great chance for advancement for right man. State experience in first letter. Address Box 52-165 care Paper Trade Journal. TF

WORKING SUPERINTENDENT for small fast growing Eastern mill making lightweight specialties. Cylinder machine experience essential. State qualifications and salary expected. Address Box 52-76 care Paper Trade Journal. TF

HELP WANTED

TOUR BOSS WANTED

For progressive two machine board mill in eastern Pennsylvania. Manufacturing set-up and folding boxboards and specialties. Steady employment. If you are available, write Box 52-255, Paper Trade Journal, giving experience and age. J-27

SITUATIONS WANTED

CHEMIST—Age 30. Nine years experience in paper. Four years experience in adhesive development and five years in technical phase of multi-wall bag manufacture. Address Box 52-246 care Paper Trade Journal. J-27

SUPERINTENDENT—25 years practical experience manufacturing folding boxboard and high grade light and heavy weight specialties from sulphite, sulphate, groundwood and old paper stock. Aggressive, capable man, good references. Address Box 52-226 care Paper Trade Journal. J-27

SUPERINTENDENT — Twenty five years practical and technical experience on fine Specialty grades. Experienced on both Yankees and Fourdrinier operation. vailable on reasonably short notice. Address Box 52-251 care Paper Trade Journal. TF

TOUR BOSS—Desires the opportunity to prove ability as Superintendent of small cylinder or Fourdrinier Mill producing folding box, or high test corrugating medium from waste. Can handle and train help. Quality and cost conscious. References, age 43. Address Box 52-262 care Paper Trade Journal. J1-4

THE SERVICES OF an Envelope Manufactnring Specialist and New Envelope Plant Organizer is available in the near future. Over 25 years of practice and specialization. For further details write ANTHONY PALMIGIANO, Jr., 85 Second Place, Brooklyn, 31, N. Y. J-11

FOR SALE

FOR SALE—1—Swenson triple effect Evaporator, copper horiz. tube, total h.s. 1320 sq. ft. with piping, supporting steel, condenser, pumps, etc.; 1—Tolhurst 40" monel basket Centrifugal, 2 speed AC motor; 3 Oliver Filters, up to 8' x 12'. Send us your inquiries. CONSOLIDATED PRODUCTS CO., INC., 15-18 Park Row, New York 38, N. Y. BArclay 7-0600. TF

PAPER COATING MACHINERY MANUFACTURERS — Waxing, Oiling, Carbon Laboratory Coating and Treating and Flat Ream Measuring and Converting Machines. New improvement. THE MAYER MACHINE COMPANY, INC., 1313 Buffalo Road, Rochester, 11, N. Y. TF

RATES FOR CLEARING HOUSE ADVERTISING

HELP WANTED—75c a line. Minimum charge $3.75.

SITUATIONS WANTED—75c a line. Minimum charge $3.75. If repeated ½ rate will be charged for each consecutive repetition.

FOR SALE—75c a line. Minimum charge $3.75.

WANTED—75c a line. Minimum charge $3.75.

OPPORTUNITIES—75c a line. Minimum charge $3.75.

Classified advertising space may also be purchased at $5.00 per single column inch. All classified advertisements are payable in advance. If box number is used—70 cents additional

Address replies to advertisements appearing under Box Number in care of
PAPER TRADE JOURNAL, 15 West 47th Street, New York 19, N. Y.

FOR SALE

FOR SALE

1—Removable Fourdrinier, Rice, Barton & Fales, 156" wide by 70' long wire, anti-friction bearings.

J. J. ROSS COMPANY

250 Frelinghuysen Ave., Newark 5, N. J.

Tel. BIgelow 3-3720 J-27

FOR SALE

FOR SALE

45" Hamblet Sheeter.
100" Dillon Sheeter with 10-roll Back-Stand.
72" Cameron 8-10 Slitter.
Model 9 Cameron Slitter, 42".
60" Oswego hand clamp Power Cutter.

THOMAS W. HALL COMPANY, Inc.

120 West 42nd St., New York 18.
(Plant at Stamford, Conn.) TF

SUBJECT TO PRIOR SALE—sheets of cellulose wadding, 18 x 24, which can be used for packaging. They have a wet strength sheet on one side and a water repellent sheet on the other side and can be used in many ways for packaging. Address Box 52-263 care Paper Trade Journal. J-27

FOR SALE—Complete used Paper Dish Machinery and paper plate machinery. Address Box 52-273 care Paper Trade Journal. J-27

FOR SALE

FOR SALE
SPECIALTY BAG PLANT
AND

House Bag and Foil Roll Business, established 1924. Now operating successfully. Fine list of customers. Convenient to Metropolitan New York area. Details furnished to responsible principals. Address Box 52-270 care Paper Trade Journal. J-27

FOUR (4) Dietz Toilet Paper Converting Machines for 81" rolls, 2 facial type, 2 regular type for either toilet towel or pleating; complete with motor drives, bars, etc. Address Box 52-259 care Paper Trade Journal. TF

CANADIAN PULPWOOD FOR SALE — Control for domestic and export. Large quantity, partly already cut. Very fine stock. Address Box 52-233 care Paper Trade Journal. J-27

Paper Trade Journal, Classified Ads Bring Good Results

1 Sandusky Suction Press Roll, 120" drill face x 22" diameter, complete, with anti-friction bearings.
1 Sandusky Suction Couch Roll, 126" drilled face x 22" diameter.

FOR SALE

BEARINGS
72—Top and bottom Dryer Bearings 7" diameter.

BEATERS
1—Dilts Iron Tub Laboratory Beater. Beater roll 14" diameter x 10½" face.

CALENDER STACKS
1—9 roll 68" Calender Stack.
1—72" 4 roll calender stack. (Extra heavy duty).
1—60" 3 roll friction calender stack. All iron rolls.
1—116"—12 roll calender stack.
1—7 roll 133" face calender stack.
1—9 roll 84" face Super calender stack.

CHEST
1—Cast Iron Stock Chest, 25' long x 6' high. (With agitator).

CHIPPER
1—96" Murray 4 knife Chipper—anti-friction bearings.

CLASSIFINER
1—Dilts Classifiner, practically new, with motor.

CRUSHER & HAMMERMILL
1—Murray Chip Crusher.
4—Jeffrey Hammermill.
1—#6 Mitts & Merrill Hog.

CYLINDER MOLDS
2—30" diameter x 72" face.
2—36" diameter x 54" face.
1—36" diameter x 96" face.
1—48" diameter x 72" face.
1—30" diameter x 92" face.
1—42" diameter x 120" face.
4—42" diameter x 130" face.
1—48" diameter x 117" face.
2—36" diameter x 110" face.

DRIVES
1—Jones Reducer 75 h.p.—30.8 to 1.
1—#6½ Reeves Drive.
1—#4 Reeves Drive
1—Reliance Electric Drive, complete with 5 gear head motors.

DRYERS
1—Complete unit, consisting of 6 dryers, 36" diameter x 38" face, including frames, gears, anti-friction bearings.
7—24" diameter x 48" face.
1—36" diameter x 143" face.
1—48" diameter x 70" face.
2—Dryers 48" diameter x 134" face.
1—24" diameter x 92½" face.
2—28" diameter x 48" face.
9—24" diameter x 60" face.
1—36" diameter x 67" face.
1—84" diameter x 48" face.
3—48" diameter x 88" face, with bearings and gears.
1—36" diameter x 90" face.
2—36" diameter x 120" face.
9—36" diameter x 76" face.
1—48" diameter x 144" face.

FLAT SCREENS
1—6 plate Shartle Flat Screen.
2—12 plate Flat Screens.

FLOW DISTRIBUTOR
1—Bertram Flow Distributor for 138" wire.

FOURDRINIER PARTS FOR 134" MACHINE
6—Suction Boxes, 23 table rolls. Brass Slide Rails.

GEARS
50 gears, for 36" diameter Dryers, 108 teeth 3¼" face.

GUILLOTINE CUTTER
1—60" Cutter.

JORDANS
1—Horne Jordan.
2—#1 Jones High Speed Jordans, with 75 h.p. motors, new 1948.
4—Noble & Wood Mammoth.
1—#2 Emerson anti friction bearing.
1—#1 Emerson.

LIME SLUDGE FILTERS
2—IMPCO Lime Sludge Filters, vacuum type, 5' diameter x 4' face.

MOTORS
Write us regarding your requirements.

PRESSES
3—Sets Primary Presses, complete, 145" face. Anti-friction bearings. Also all types of rolls for 145" wet end.

PULLEYS
Various cone and assorted pulleys.

PULPERS
1—Jones Pulper. Complete with motor and drive.
1—Noble & Wood Pulper—Iron Tub.
1—Lannoye Pulper.

PUMPS
1—Gould Triplex Hydraulic Pump, 2 x 6, 1750# pressure.
Various sizes of Centrifugal and Plunger Pumps. Write us regarding your particular requirements.
3—Shartle Brothers circulating pumps, each 4,000 g.p.m.
1—Frederick, 8 x 12, with motor.
1—Shartle, 8 x 14, 2000 g.p.m., 62' head, direct connected to circulating pump, with motor.

REELS
1—123"—3 bowl Revolving Reel.
1—72" Dowingtown Reel, 2 bowl.
1—134"—2 drum.

REFINERS
2—#1 Claflin Refiners.

ROLLS
3—Rubber Cover Press Rolls, 76" face x 18½" diameter. Plastometer 25.
Felt, Table, Press, Breast, Couch, etc. Various sizes and types. (Bronze, Rubber. Iron, etc.)

ROTARY SCREENS
2—#2 Bird—Copper vats—complete.
1—#2A Bird—Copper vats—complete.

SAVEALLS
2—#5 Bird Saveall.
2—Savealls, 36" diameter x 136" face cylinder molds, iron end vats.

SHAKER ROLLS
1—134" face x 14" diameter with Messenger bearings.
1—104" face x 14" diameter with Messenger bearings.

SHEETERS
1—124" Moore & White—with layboy.
1—138" Moore & White—with layboy.
1—82" Clark Aiken Sheeter.
1—60" Hamblet Sheeter.
1—45" Sheeter.

SHREDDERS
2—Daniels Rag Cutters.

SLITTERS & WINDERS
1—115" 2 drum Waldron
1—104" Beloit two drum winder.
1—92" Moore & White 4 drum winder.
1—72" Cameron—Type 8-10.
1—72" Cameron—Type 10.
1—62" Cameron—Type 10.
1—60" Langston (Shear cut).
1—52" Cameron—Type 6.
2—42" Cameron Type 40-1-AF
2—42" Cameron—Type 6.
1—42" Cameron Constant Tension with pneumatic control.
1—84" Langston Slitter.

STEAM JOINTS
30—Beloit Steam Joints.

STOCK PUMPS
1—10 x 20 Shartle Duplex.
1—7 x 16 Shartle Duplex.
2—10 x 10 Beloit Duplex, low type, with motors.
Advise us to your requirements.

SUCTION BOXES
5—136" face Suction Boxes.
6—140" face.

SUCTION PRESS ROLLS
1—Sandusky Suction Press Roll 130" drilled face x 14⅜" diameter.
1—Sandusky Suction Press Roll 102" drilled face x 14⅜" diameter.
1—Sandusky Suction Press Roll 88" drilled face x 14⅜" diameter.
1—Sandusky Suction Press Roll, 120" drilled face x 22" diameter, complete.

TABLE ROLLS
23—5½" diameter x 138" face. (Rubber covered).

THICKENERS
1—Pulp Thickener, cylinder mold 48" x 117", with spare cylinder mold.

TOILET WINDERS
2—72" Hudson-Sharp (Surface type winder).
4—81" Deitz.
1—67½" Deitz (Could be changed for toilets).

VACUUM PUMPS
1—N-82 Nash, for Fulton-Midwest System.

WET MACHINE
1—72" Wet Machine.

YANKEE DRYERS
1—48" Face x 84" Diameter, Frames & Bearings.

Paddy Ross, Pres. **Ben Kurs, Treas.**

J. J. ROSS COMPANY

250 Frelinghuysen Ave. **Tel.—BIgelow 3-3720** **Newark 5, N. J.**

WANTED | WANTED | WANTED

PAPER CONVERTERS
G. B. GOLDMAN PAPER COMPANY
Sheeting — Slitting — Rewinding — Flat Cutting
all grades of paper

BUYERS OF JOB LOT PAPER ITEMS — SALVAGE — REJECTS, SIDE RUNS — DAMAGED, ETC.

Third & Wood Streets, Philadelphia 6, Pa. Phone: Lombard 3-6714

J-27

FOR SALE | FOR SALE

FOR SALE

1—#2 APMEW Pulper, 15 ft. x 10 ft. depth, roller bearing, practically new.

3—Cheney Bigelow Thickeners, cylinder molds 36" x 110", complete with motors and air controls.

1—Bird Machine Co. Dirtecs, 1—6" primary and 1—2" secondary.

1—Hyster #20 Fork Lift Truck, 2000 lbs., practically new.

1—Hyster #40 Fork Lift Truck, 4000 lbs.

1—Stainless Steel Sectional Bleach Tank, 8½' diameter x 19' high, with IMPCO drive agitator, 25 h. p. motor, etc.

ALL OF ABOVE FOR IMMEDIATE DELIVERY.

J. J. ROSS COMPANY
250 Frelinghuysen Ave., Newark 5, N. J.
Tel. Bigelow 3-3720

J-27

WANTED

WANTED—CAMERON SLITTER for paper boards caliper .010 to .030. Prefer 62" width. Address Box 52-277 care Paper Trade Journal. J-27

MORE AND MORE

Individuals and Companies are ordering Lockwood's Directory each day.

It contains almost 1500 pages of vital information to everybody connected with the Paper Industry.

Order yours today.

$10. per copy.

LOCKWOOD TRADE JOURNAL CO., INC.
15 West 47th Street
New York, N. Y.

FOR SALE
COMPLETE PAPER BOX PLANT

Contents of complete up to date paper box plant. Vicinity New York City. To be sold as one unit. For further particulars, address Box 52-279 care Paper Trade Journal. J-27

FOR SALE—45" Beck Sheeter with Electric Eye; 48" Kidder Sheeter with Layboy; 48" Knowlton Shear Cut Slitter & Rewinder (like new); No. 7 Brightwood; Staude and International Folding Box Gluers; No. 3 (46") and 5/0 (65") Miehle Die Cutters and Printers; Set-up Box Machines, all Makes and Models; write for prices on these and OVER 60 PAPER BOX & PAPER CONVERTING MACHINES FOR SALE. Address Box 52-272 care Paper Trade Journal. TF

WANTED

WANTED TO BUY—Late model Hudson Sharp Modern Dispenser Type Napkin Machine and Hudson Sharp or Paper Converting Towel and Toilet Tissue Folders. Address Box 52-260 care Paper Trade Journal. J1-3

WANTED—Beater Roll and Shaft for Dilts 1650# Beater, #1 Top Liner for #2 Machine; also intermediate Calender Roll for #2 Machine. Address Box 52-276 care Paper Trade Journal. J-4

SALES REPRESENTATION | SALES REPRESENTATION

OPPORTUNITY

CONSULTING ENGINEER

Specializing in converting plant operations, product and equipment, improvement and development, operational problems involving all forms of industrial printing, coating, gumming, laminating, die cutting and folding. A practical service devoted to cost reduction. Rate information on request.

E. A. Crawford — **Edgewood Station**
Providence 5 — **Rhode Island**

J-4

SALES REPRESENTATIVE

Prominent manufacturer of paper machine clothing has opening for sales representative.

We need a young man with initiative, moderate habits, good personality and appearance who must have considerable experience on paper machines.

Sales experience is desirable but not necessary.

Send detailed application with photo (which will not be returned) to Box 52-268 care PAPER TRADE JOURNAL.

TF

WHERE TO BUY

ABRASIVES
Norton Co.
Simonds Abrasive Co.

ADHESIVES
American Cyanamid Company
Plastics & Resins Division
Diamond Alkali Co.
The Dow Chemical Co.
E. I. du Pont de Nemours & Co., Inc.
B. F. Goodrich Co.
The Goodyear Tire & Rubber Company
Monsanto Chemical Co.
Morningstar, Nichol, Inc.
National Starch Products, Inc.
Nopco Chemical Co.
Plaskon Division,
Libbey-Owens-Ford Glass Co.
Reichhold Chemicals, Inc.
Rohm & Haas Co.

ADJUSTABLE SHAKE MOTION
Manchester Machine Co.
Rice Barton Corporation

AGITATORS
Apmew, Inc.
Appleton Machine Co.
Biggs Boiler Works Co.
Dilts Machine Works, Inc.
Downingtown Mfg. Co.
Improved Paper Machinery Corp.
E. D. Jones & Sons Co.
Midwest Fulton Mch. Co.
D. J. Murray Mfg. Co.
Moore & White Co.
The Noble & Wood Machine Co.
Rice Barton Corporation
The Sandy Hill Iron & Brass Works
Valley Iron Works Co.
Shartle Brothers Machine Co.

AIR CONDITIONING
Jamar-Olmen Co.

ALLOYS
Michigan Steel Casting Co.

ANTIFOAM
American Cyanamid Company
Industrial Chemicals Division
Hercules Powder Co., Inc.
National Aluminate Corp.
Nopco Chemical Co.

APRON CLOTH
Williams-Gray Co.

BAG MACHINES
Dilts Machine Works
Potdevin Machine Co.
H. G. Weber & Co., Inc.

BALL MILLS
F. L. Smidth & Co.

BARK BURNER
Combustion Engineering-Superheater, Inc.
Nichols Engrg. & Research Corp.

BARKERS AND CHIPPERS
Appleton Machine Co.
Carthage Machine Co.
Improved Paper Machinery Corp.
D. J. Murray Mfg. Co.
The Noble & Wood Machine Co.
Valley Iron Works Co.

BARS
Dilts Machine Works
E. D. Jones & Sons Co.
Midwest Fulton Mch. Co.
The Moore & White Co.
Shartle Brothers Machine Co.
Valley Iron Works Co.

BASIC WEIGHT SCALES
Thwing-Albert Instrument Co.

BEARINGS
The Bagley & Sewall Company
Black Clawson Company
Dodge Mfg. Corp.
B. F. Goodrich Co.
E. D. Jones & Sons Co.
Magnus Metal Corp.
The Moore & White Co.
The Noble & Wood Machine Co.
Rice Barton Corporation
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
SKF Industries
Timken Roller Bearing Co.
The Torrington Co.
Valley Iron Works Co.
Westinghouse Electric Corp.

BEATERS
Cowles Company

BEATERS AND JORDANS
Apmew, Inc.
The Appleton Machine Co.
Black Clawson Company
Dilts Machine Works
Downingtown Mfg. Co.
Hermann Mfg. Co.
E. D. Jones & Sons Co.
Midwest Fulton Mch. Co.
Morden Machines Co.
The Noble & Wood Machine Co
J. J. Ross Company
Ross Paper Machy. Co.
Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co
Smith & Winchester Mfg. Co.
Valley Iron Works Co.

BED PLATES
Bahr Brothers Mfg. Co.
Dilts Machine Works, Inc.
Downingtown Mfg. Co.
Farrel-Birmingham Co., Inc
E. D. Jones & Sons Co.
Lukenweld Div., Lukens Steel Co.
Midwest Fulton Mch. Co.
The Noble & Wood Machine Co
Rice Barton Corporation
Shartle Brothers Machine Co
Valley Iron Works Co.

BELTING
Alexander Bros. Belting Co.
Graton & Knight Inc.
Goodrich, B. F., Co.
The Goodyear Tire & Rubber Company
Manheim Mfg. & Belting Co.

BINS, STORAGE
Biggs Boiler Works Co.
The Noble & Wood Machine Co

BLEACHING AGENTS
E. I. du Pont de Nemours & Co., Inc.
General Dyestuff Corp.
Rohm & Haas Co.
Virginia Smelting Co.

BLEACHING APPARATUS
Improved Paper Machinery Corp
E. D. Jones & Sons Co.
Perkins & Sons, Inc., B. F.
Moore & White Co.
Niagara Alkali Co.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.

BLOW PIPES & PITS
Carthage Machine Co.
Kalamazoo Tank & Silo Co.
Moore & White Co.
Murray Mfg. Co., D. J
Walworth Company

BOARD MACHINES
The Noble & Wood Machine Co.

BOILERS
Babcock & Wilcox Co.
Biggs Boiler Works Co.
Combustion Engineering-Superheater, Inc.

BOTTOMS
Kalamazoo Tank & Silo Co
Valley Iron Works Co.

BOXBOARD SCALES
Thwing-Albert Instrument Co

BRUSH ROLLS
M. W. Jenkins Sons, Inc.
Gus Reidel & Son

BRUSHES
M. W. Jenkins Sons, Inc.
Gus Reidel & Son
The Sandy Hill Iron & Brass Works
Smith & Winchester Mfg. Co

BUILDING MAINTENANCE CONTRACTORS
Gilbert Engineering Co.

BURSTING TESTERS
B. F. Perkins & Son Inc.
Testing Machines, Inc.

CALENDERS
The Bagley & Sewall Company
Beloit Iron Works
Black Clawson Company
Downingtown Mfg. Co.
Farrel-Birmingham Co., Inc.
Lobdell United Co.
The Moore & White Co.
Perkins & Sons, Inc., B. F.
Rice Barton Corporation
J. J. Ross Company
Ross Paper Machy. Co.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Smith & Winchester Mfg. Co
Valley Iron Works Co.

For superior quality and uniform performance...

OK BRAND

STARCHES

OK BRAND STARCHES for tub and beater sizing are of highest quality, uniformly maintained.

AT YOUR SERVICE! The Hubinger technical staff and laboratories are widely recognized for their thorough and practical knowledge of the use of starch in making paper. Their experience assures you of the *best* product, *tailor-made* to fit *your specific needs*. Consult us on any production problem —at no obligation, of course.

THE HUBINGER COMPANY
KEOKUK, IOWA • • • EST. 1881

CARRIER ROPE
Williams-Gray Co.

CASEIN
American Cyanamid Co.
Industrial Chem. Div.
Hercules Powder Co.

CASTINGS
Appleton Machine Co.
The Bagley & Sewall Company
Black Clawson Company
Babcock & Wilcox Co.
Carthage Machine Co.
Dilts Machine Works
Downingtown Mfg. Co.
Farrel-Birmingham Co.
Hamblett Machine Co.
Lobdell United Co.
Magnus Metal Corp.
Michigan Steel Casting Co.
The Noble & Wood Machine Co.
Rice Barton Corporation
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Smith & Winchester Mfg. Co.
Valley Iron Works Co.
Walworth Company

CENTRIFUGAL MACHINERY
Bird Machine Co.
Nichols Engrg. & Research Corp.
Ross, J. O., Engrg. Co.
Shartle Brothers Machine Co.

CHAINS
Jeffrey Mfg. Co.

CHEMICAL COTTON PULP
Hercules Powder Co.

CHEMICALS
American Cyanamid Co., Industrial Chem. Div.
Calco Chemical Co.
Calgon, Inc.
Diamond Alkali Co.
Dow Chemical Company
E. I. du Pont de Nemours & Co., Inc.
General Dyestuffs Corp.
Geigy Co., Inc.
B. F. Goodrich Chemical Co.
Gottesman & Co.
Hercules Powder Co.
Heyden Chemical Corp.
Hooker Electrochemical Co.
The Kinsley Chemical Company
Monsanto Chemical Company
National Aluminate Corp.
Naugatuck Chemical Division of U. S. Rubber Co.
Niagara Alkali Company
Nopco Chemical Co.
Pittsburgh Plate Glass Co., Columbia Chemical Division
Reichhold Chemicals, Inc.
Rohm & Haas Co.
Virginia Smelting Co.
Wyandotte Chemicals Corp., Michigan Alkali Div.

CHESTS
The Bagley & Sewall Company
E. D. Jones & Sons Co.
Kalamazoo Tank & Silo Co.
Midwest Fulton Mch. Co.
The Noble & Wood Machine Co.
Shartle Bros. Mch. Co.

CHUCKS
Efficiency Engrg. Co.

CLEANING MACHINES
Hydro-Silica Corp.

CLEANING MATERIALS
American Cyanamid Company Industrial Chemicals Division
Diamond Alkali Co.
The Dow Chemical Company
E. I. du Pont de Nemours & Co., Inc.
General Dyestuff Corp.
Monsanto Chemical Company
Nopco Chemical Co.
Pittsburgh Plate Glass Co.
Wyandotte Chemicals Corp., J. B. Ford Division

CLOTH
Lindsay Wire Weaving Co.

CLUTCHES
Appleton Machine Co.
The Bagley & Sewall Company
Black Clawson Company
Dodge Mfg. Corp.
Farrel-Birmingham Co.
Hudson-Sharp Mch. Co.
Moore & White Co.
D. J. Murray Mfg. Co.
Rice Barton Corporation
The Sandy Hill Iron & Brass Works
Shartle Bros. Mch. Co.

COATING MACHINERY
Dilts Machine Works
Frank W. Egan & Co.
Gibbs-Brower Company, Inc.
The Mayer Machine Co., Inc.
Moore & White Co.
Potdevin Machine Co.
Rice Barton Corporation
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Waldron Corporation, John
Weber, Herman G., & Co., Inc.

COATING MATERIALS
American Cyanamid Company Industrial Chemicals Division
The Dow Chemical Co.
E. I. du Pont de Nemours & Co., Inc.
B. F. Goodrich Chemical Co.
The Goodyear Tire & Rubber Company
Hercules Powder Co.
J. M. Huber Corp.
Monsanto Chemical Company
Naugatuck Chemical Division of U. S. Rubber Co.
Nopco Chemical Co.
Plaskon Division, Libbey-Owens-Ford Glass Co.
Reichhold Chemicals, Inc.
Wyandotte Chemicals Corp., Michigan Alkali Div.

COMPLETE FOURDRINIER ROLL GRINDING
Manchester Machine Co.

COMPRESSORS
Nash Engineering Co.
Roots-Connersville Blower Corp.

CONDENSATE FILTERS
Hungerford & Terry, Inc.
The Permutit Company

CONDENSERS
Biggs Boiler Works Co.
Midwest Fulton Mch. Co.

CONDITIONING
Vap Systems Co.

CONTRACTORS
Meyer & Sons Co.

CONSISTENCY REGULATORS
Askania Regulator Co.
Bird Machine Company
DeZurik Shower Company
Pandia, Inc.
Trimbey Machine Works

CONSULTING ENGINEERS
Black Clawson Company
Dilts Machine Works
Ebasco Services
Frank W. Egan & Co.
Ferguson, H. K., Company
Alvin H. Johnson & Co., Inc.
Main, Inc., Chas. T.
O'Donoghue, Roderick
The Rust Engrg. Co.
Shartle Bros. Mch. Co.
J. E. Sirrine & Co.
Frank C. Vaughan
John Waldron Corp.

CONTINUOUS DIGESTER
Pandia, Inc.

CONTROLLERS
Black Clawson Company
The Brown Instrument Co.

CONTROLS
The Brown Instrument Co.
Johnson Corp.
Poirier Control Co.
Shartle Bros. Mch. Co.
Westinghouse Electric Corp.

CONVERTING MACHINERY
The Bagley & Sewall Company
Egan, Frank W., & Co.
John Waldron Corp.
Dilts Machine Works

CONVEYORS
Black Clawson Company
Jeffrey Mfg. Co.
Murray, D. J., Mfg. Co.
Ross Engineering Corp., J. O.
Shartle Brothers Mch. Co.

CORES
Elixman Paper Co.
Smith & Winchester Mfg. Co.
Sonoco Products Co.

CORROSION RESISTANT
Amercoat Corporation

COTTON LINTER
Hercules Powder Co., Inc.
Railway Supply & Mfg. Co.

COUCH ROLLS
Beloit Iron Works
Improved Paper Machinery Co.
Manchester Machine Co.

OVER 1,000,000 TONS

of Sulphite, Craft and Groundwood pulp per year are produced in Canada alone at a good profit on the efficient, well-proven P.M.L.—Kamyr Wet Machines at no operating risk.

For Best Quality & Low Cost Production

Please Note—Patented:

P. M. L. — KAMYR WET MACHINE
S. F. FLAKT DRYER FOR HIGHEST EFFICIENCY AND BEST DRIED QUALITY PRODUCT
WAPLAN BARKING DRUMS & BARK PRESSES
BLEACHING EQUIPMENT
SPIRAL HEAT EXCHANGERS
KNOTTERS, SCREENS
SMYTHE & AHLFORS FLAT SCREENS

supplied by us for best quality and lowest cost of production to meet world competition.

For Modern, Economical Machinery and methods please enquire, order from

PAPER MACHINERY LTD.
PAPER MILL EQUIPMENT LTD. **HYDRO TURBINE COMPANY LTD.**

HEAD OFFICE: 921 Sun Life Building, Montreal, P. Que., Canada

COUPLINGS
The Bagley & Sewall Company
Black Clawson Company
Farrel-Birmingham Co., Inc.
Hermann Mfg. Co.
E. D. Jones & Sons Co.
Dodge Mfg. Corp.
Moore & White Co.
The Noble & Wood Machine Co.
Rice Barton Corporation
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Valley Iron Works
Waldron Corp., John

CRANES
Reading Crane & Hoist Corp.
Whiting Corp.

CURL TESTER
Thwing-Albert Instrument Co.

CUTTERS
The Bagley & Sewall Company
Beloit Iron Works
Black Clawson Company
Dilts Machine Works
Dusenbery Co., Inc.
Gibbs-Brower Company, Inc.
Graphic Arts International Corp.
Thomas W. Hall Co.
Jagenberg-Werke Akt. Ges.
Moore & White Co.
Perkins & Son, Inc., B. F.
Rice Barton Corporation
The Sandy Hill Iron & Brass Works
The Smith & Winchester Mfg. Co.
Taylor, Stiles & Co.

CYLINDER MOULDS
Black-Clawson Co.
Hayden Wire Works Inc.
Improved Paper Machinery Corp.
Manchester Machine Co.
Rice Barton Corporation
Sinclair Company

CYLINDERS
Biggs Boiler Works Co.
M. W. Jenkins Sons, Inc.

CYLINDER WIRES
Hayden Wire Works Inc.

DAMPENERS
Perkins & Son, Inc., B. F.
Valley Iron Works Co.

DANDY ROLLS
Plank Company

DECKLE WEBBING
Williams-Gray Co.

DEFIBRATORS
American Defibrator Co.

DEFOAMERS
American Cyanamid Co., Ind. Chem. Div.
Hercules Powder Co., Inc.

DE-INKING
Bird Machine Co.
Dilts Machine Works
General Dyestuff Corp.
Kinsley Chemical Co.
Rice Barton Research Corp.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.

DEINKING CHEMICALS
E. I. du Pont de Nemours & Co., Inc.
General Dyestuff Corp.
Kinsley Chemical Co.
Nopco Chemical Co.

DE-MINERALIZING EQUIPMENT
Hungerford & Terry, Inc.

DEMULSIFIERS
Wyandotte Chemicals Corp., Michigan Alkali Div.

DENSOMETERS
W. & L. E. Gurley

DESIGN CONSTRUCTION
Ebasco Services

DETERGENTS
Amalgamated Chemical Corp.
American Cyanamid Company Industrial Chemicals Division
Calgon, Inc.
Diamond Alkali Co.
General Dyestuff Corp.
Monsanto Chemical Company
Nopco Chemical Co.
Rohm & Haas Co.
Wyandotte Chemicals Corp., Michigan Alkali Div.

DEWAXING CHEMICALS
American Cyanamid Company Industrial Chemicals Division
General Dyestuff Corp.
Nopco Chemical Co.

DIFFERENTIAL SCALES
Thwing-Albert Instrument Co.

DIGESTERS
Babcock & Wilcox Co.
Biggs Boiler Works Co.
Blaw Knox Company
Chicago Bridge & Iron Co.
Combustion Engineering-Superheater, Inc.
Lukenweld
Pandia, Inc.
Paper & Industrial Appliances
Pusey & Jones Corp.

DISPERSING AGENTS
Calgon, Inc.
Diamond Alkali Co.
General Dyestuff Corp.
Monsanto Chemical Company
National Aluminate Corp.
Nopco Chemical Co.
Rohm & Haas Co.
Wyandotte Chemicals Corp., Michigan Alkali Div.

DOCTORS
The Bagley & Sewall Company
Bird Machine Company
Black Clawson Company
Downingtown Mfg. Co.
Lobdell United Co.
Lodding Engineering Corp.
The Moore & White Co.
Rice Barton Corporation
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.

DOCTOR BLADES
The Bagley & Sewall Company
Bird Machine Company
Lodding Engrg. Corp.
The Moore & White Co.
Rice Barton Corporation
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Simonds Saw & Steel Co.
Westinghouse Electric Corp.

DRIERS
The Bagley & Sewall Company
Biggs Boiler Works Co.
Black Clawson Company
Downingtown Mfg. Co.
Gibbs-Brower Company, Inc.
Lukenweld
The Moore & White Co.
Murray Mfg. Co., D. J.
J. J. Ross Company
Red-Ray Mfg. Co., Inc.
Rice Barton Corporation
Ross Paper Machy. Co.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Valley Iron Works Co.

DRIERS—LABORATORY
The Noble & Wood Machine Co.

DRILLED SUCTION COUCH ROLLS
Manchester Machine Co.

DRILLED SUCTION DRUM ROLLS
Manchester Machine Co.

DRIVES
Appleton Machine Co.
The Bagley & Sewall Company
Beloit Iron Works
Bird Machine Co.
Black Clawson Company
Dodge Mfg. Corp.
Downingtown Mfg. Co.
Farrel-Birmingham Co.
Jeffrey Mfg. Co.
General Electric Company
Gibbs-Brower Company, Inc.
Manchester Machine Co.
Moore & White Co.
Murray, D. J., Mfg. Co.
Pusey & Jones Corp.
Rice Barton Corporation
J. J. Ross Company
Ross Paper Machy. Corp.
The Sandy Hill Iron & Brass Works
Shartle Bros. Mch. Co.
Valley Iron Works Co.

DRUM WINDERS
Manchester Machine Co.
Rice Barton Corporation

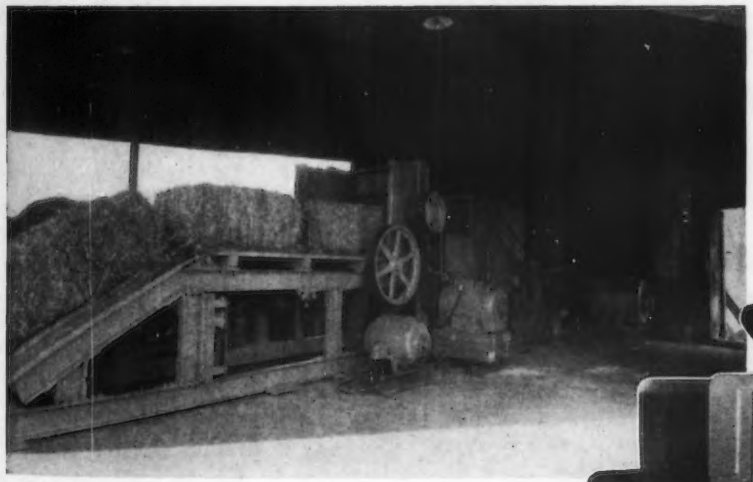
DRYER ROLL PYROMETER
Midwest Fulton Mch. Co.
Thwing-Albert Instrument Co.

DUSTERS
Appleton Machine Co.
Downingtown Mfg. Co.
Frank W. Egan & Co.
M. W. Jenkins Sons, Inc.
E. D. Jones & Son Co.
Moore & White Co.
D. J. Murray Mfg. Co
John Waldron Corp.

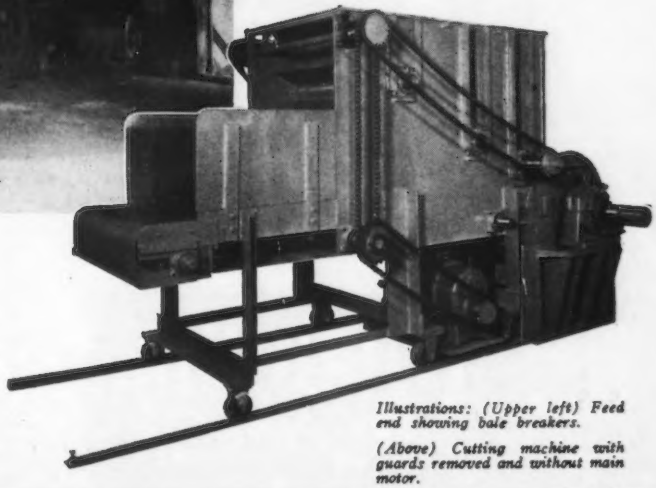
DUSTING BRUSHES
M. W. Jenkins Sons, Inc.

DYESTUFFS
American Cyanamid Company
Calco Chemical Div.
Ciba Company

A NEW COMBINATION BALE OPENER AND STRAW CUTTER



This new machine is part of the development program sponsored by the U. S. Government and by the paper manufacturers to improve the processing of straw for incorporation in strawboard and other papers.



- It opens the bales.
- Cuts the straw to short lengths.
- Shortens the time in the digesters.
- Improves the product.
- Permits the use of straw in papers where never possible before.
- Cuts up to 1000 pounds of straw per minute.

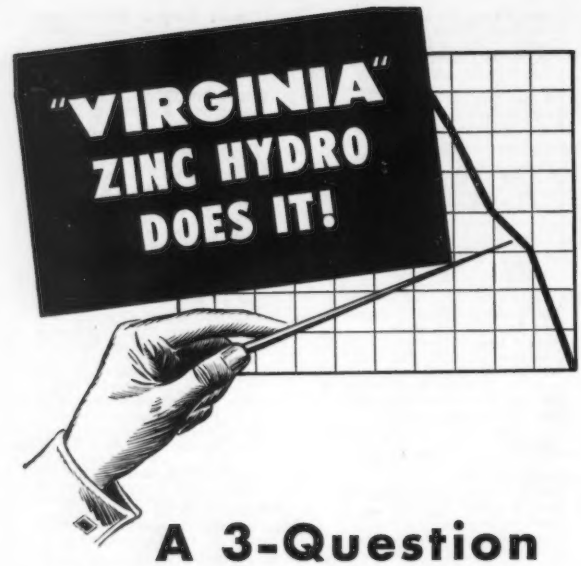
Illustrations: (Upper left) Feed end showing bale breakers.

(Above) Cutting machine with guards removed and without main motor.

For full particulars write or wire—

TAYLOR, STILES & CO.

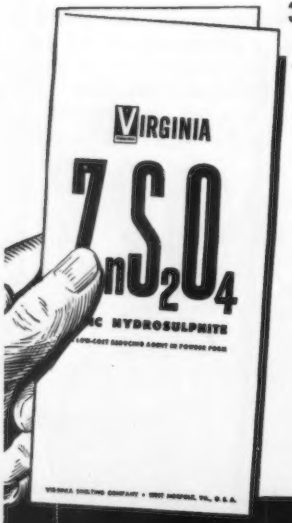
10 Bridge Street **Riegelsville, N. J.**



A 3-Question Quiz on Economy

"Virginia" Zinc Hydro has been used as a groundwood bleach long enough for its brightening properties to be proved. Groundwood mills contemplating installation of a bleaching process should consider these questions:

1. What increase in brightness can be expected?
2. What will be the ton cost per unit of brightness to bleach with Zinc Hydro?
3. Is a capital investment for auxiliary equipment required in the Zinc Hydro process?



When you have the answers to these three questions, we predict an acute interest in "Virginia" Zinc Hydrosulphite. May we send you the answers with a product sample for testing purposes?

VIRGINIA SMELTING CO.
West Norfolk 3, Virginia

Field Offices:
NEW YORK
BOSTON
DETROIT
CHICAGO
PHILADELPHIA
ATLANTA

VIRGINIA Chemicals
SINCE 1898

E. I. du Pont de Nemours & Co., Inc.
Geigy Co., The
National Aniline Division, Allied Chemical & Dye Corp.

ELECTRIC HYGROMETER
Thwing-Albert Instrument Co.

ELECTRICAL PRECIPITATORS
Research Corporation

EMBOSSING MACHINES
Dilts Machine Works
Egan, Frank W., & Co.
John Waldron Corp.

EMBOSSING ROLLS
The Appleton Machine Co.
Gibbs-Brower Company, Inc.
Holyoke Machine Co.
B. F. Perkins & Son, Inc.
John Waldron Corp.
Wheeler Roll Co.

EMPLOYMENT SERVICE
Bixby, R. W., Inc.
Raymond, Chas. P., Service, Inc.

EMULSIFIERS
General Dyestuff Corp.
Nopco Chemical Co.
Rohm & Haas Co.
Wyandotte Chemicals Corp.

ENZYMES
Rohm & Haas Co.
Vanderbilt Co., R. T.

EVAPORATORS
Biggs Boiler Works Co.
Goslin-Birmingham Mfg. Co., Inc.
Murray, D. J., Mfg. Co.
Swenson Evaporator Co., Div. of Whiting Corp.
Westinghouse Electric Corp.

EXPANDERS
Mount Hope Machinery Co.

FANS
General Electric Co.
B. F. Perkins & Son, Inc.
Ross Engineering Co., J. O.
Westinghouse Electric Corp.

FEEDERS
Jeffrey Mfg. Co.
Merrick Scale Mfg. Co.
The Permutit Company

FELTS
Appleton Woolen Mills
Asten-Hill Mfg. Co.
Draper Bros. Corp.
Huyck & Son, F. C.
Lockport Felt Co.
Morey Paper Mill Supply Co.
Orr Felt & Blanket Co.
Shuler & Benninghofen
Waterbury Felt Co.
Waterbury, H., & Sons Co.
Williams-Gray Co.

FELT CLEANERS
Calgon, Inc.
General Dyestuff Corp.
Nopco Chemical Co.

FELT CONDITIONERS
Bird Machine Co.
The Noble & Wood Machine Co.
Rice Barton Corporation
The Sandy Hill Iron & Brass Works

FELT GUIDES
Black Clawson Company
Frank W. Egan & Co.
Gilbert & Nash Co.
Moore & White Co.
The Noble & Wood Machine Co.
Rice Barton Corporation
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Waldron Corp., John

FIBRE BOARD MACHINES
The Noble & Wood Machine Co.

FILLERS
American Cyanamid Company, Industrial Chemicals Division
J. M. Huber Corp.
A. M. Meincke & Son, Inc.
Vanderbilt Co., R. T.
Wyandotte Chemicals Corp., Michigan Alkali Div.

FILTERS
R. P. Adams Co., Inc.
Bird Machine Company
Holyoke Machine Co.
Hungerford & Terry, Inc.
Improved Paper Machinery Corp.
Johnson Corp.
Moore & White Co.
J. O. Ross Engrg. Corp.
The Sandy Hill Iron & Brass Works
Walworth Company

FITTINGS
The Bagley & Sewall Company
Crane Company
Shartle Bros. Mch. Co.
Walworth Company

FLEXIBLE COUPLINGS
Egan, Frank W., & Co.
Jeffrey Mfg. Co.
John Waldron Corp.
Westinghouse Electric Corp.

FLOORING, GRATING AND TREADS
The Goodyear Tire & Rubber Company
Norton Co.

FLOW BOXES
Biggs Boiler Works Co.
Lukens Steel Co.
Rice Barton Corporation
The Sandy Hill Iron & Brass Works

FORK LIFT TRUCKS
Elwell Parker Elec. Co.
Towmotor Corp.

FORMATION TESTERS
Thwing-Albert Instrument Co.
Williams Apparatus Co., Inc.

FOURDRINIERS
Beloit Iron Works
Black Clawson Company
Downingtown Mfg. Co.
Manchester Machine Co.
The Moore & White Co.
Noble & Wood Machine Co.
Rice Barton Corporation
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.

FREENESS TESTERS
Testing Machines, Inc.
Williams Apparatus Co.

GASKETS
B. F. Goodrich Co.
The Goodyear Tire & Rubber Company

GEAR REDUCERS
Dodge Mfg. Corp.

GEARS
The Bagley & Sewall Company
Black Clawson Company
De Laval Steam Turbine Co.
Downingtown Mfg. Co.
Frank W. Egan & Co.
Farrel-Birmingham Co.
E. D. Jones & Sons Co.
Moore & White Co.
D. J. Murray Mfg. Co.
Rice Barton Corporation
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Smith & Winchester Mfg. Co.
Valley Iron Works Co.
Westinghouse Electric Corp.
Western Gear Works

GRAPPLES
Blaw-Knox Company

GRAVITY FILTERS
Holyoke Machine Co.

GRINDERS
Carthage Machine Co.
Farrel-Birmingham Co.
Gibbs-Brower Company, Inc.
Lobdell United Co.
Norton Company
Samuel C. Rogers and Company
The Sandy Hill Iron & Brass Works

GRINDING WHEELS
Norton Company
Simonds Abrasive Co.

GUIDES
The Bagley & Sewall Company
Black-Clawson Co.
Egan, Frank W., & Co.
Gilbert & Nash Co.
The Moore & White Co.
Mount Hope Machinery Co.
Rice Barton Corporation
John Waldron Corp.

GUMMING MACHINES
Dilts Machine Works
Egan, Frank W., & Co.
The Sandy Hill Iron & Brass Works
Waldron, John, Corp.

GUMS
Hercules Powder Co., Inc.
National Starch Products, Inc.

HEAT EXCHANGERS AND RECOVERY SYSTEMS
Westinghouse Electric Corp.

HEATING, VENTILATING & AIR CONDITIONING
The Appleton Machine Co.
E. D. Jones & Sons Co.
General Electric Co.
D. J. Murray Mfg. Co.
Red-Ray Mfg. Co., Inc.
Ross Engineering Corp., J. O.
Ross, J. O., Engrg. Corp.
Valley Iron Works Co.
Westinghouse Electric Corp.

HOISTS
Reading Crane & Hoist Corp.

HOSE (Air, Water, Suction, etc.)
B. F. Goodrich Co.
The Goodyear Tire & Rubber Company

HUMECTANTS
Aktivin Division, Heyden Chemical Corp.
Nopco Chemical Co.
Wyandotte Chemicals Corp., Michigan Alkali Div.

IMPREGNANTS
American Cyanamid Company, Industrial Chemicals Division
B F. Goodrich Chemical Co.

INDENTING MACHINES
Dilts Machine Works

INDUSTRIAL TIRES
B. F. Goodrich Co.

INDUSTRIAL TRACTORS
Towmotor Corp.

INKOMETER
Thwing-Albert Instrument Co.

INSTRUMENTS, TESTING AND MEASURING
Black-Clawson Co.
Brown Instrument Co.
Cambridge Instrument Co.
General Electric Company
W. & L. E. Gurley
B. F. Perkins & Son
Taylor Instrument Cos.
Testing Machines, Inc.
Thwing-Albert Instrument Co.
A. van der Korput
Williams Apparatus Co.
Westinghouse Electric Corp.

JOINTS
The Bagley & Sewall Company
Beloit Iron Works
Johnson Corp.
Rice Barton Corporation
Shartle Bros. Mch. Co.

JORDAN FILLINGS
Appleton Machine Co.
Bahr Brothers Mfg. Co.
E. D. Jones & Sons Co.
The Noble & Wood Machine Co.
Shartle Bros. Mch. Co.
Smith & Winchester Mfg. Co.
Valley Iron Works Co.

KNIVES
Black Clawson Company
Bolton & Sons, Inc.
Dilts Machine Works, Inc.
Dusenbery Co., Inc.
Hamblet Machine Co.
E. D. Jones & Sons Co.
The Moore & White Co.
The Noble & Wood Machine Co.
Simonds Saw & Steel Co.
Taylor Stiles & Co.
Valley Iron Works Co.

KNOTTERS
Black-Clawson Co.
Improved Paper Machinery Corp.

LABORATORY CORRUGATOR
The Noble & Wood Machine Co.
Thwing-Albert Instrument Co.

LABORATORY EQUIPMENT
Appleton Machine Co.
Bauer Brothers Co.
Biggs Boiler Works Co.
Bird Machine Company
Dilts Machine Works
W. & L. E. Gurley
Egan, Frank W., & Co.
Hermann Mfg. Co.
E. D. Jones & Sons Co.
Taylor Instrument Companies
Testing Machines, Inc.
Valley Iron Works Co.
John Waldron Corp.
Williams Apparatus Co., Inc.

LAMINATING MACHINES
The Bagley & Sewall Company
Dilts Machine Works
Egan, Frank W., & Co.
Rice Barton Corporation
John Waldron Corp.

LAY BOYS
Dilts Machine Works
Gibbs-Brower Company, Inc.
Hamblet Machine Co.
Moore & White Co.

LINTER COTTON
Hercules Powder Co., Inc.
Railway Supply & Mfg. Co.

LINTER PULP
Hercules Powder Co., Inc.

LUBRICANTS
Sinclair Refining Co.
Socony-Vacuum Oil Co.
Sun Oil Company
The Texas Company
Tide Water Associated Oil Co.

MAGAZINE REELS
Dilts Machine Works (Kohler Systems)

MATERIALS HANDLING
Dilts Machine Works
Jeffrey Mfg. Co.
Shartle Bros. Mch. Co.
The Wellman Engrg. Co.

MICROMETERS & CALIPERS
Farrel-Birmingham Co.
Lobdell Co.
Testing Machines, Inc.

MIXERS
Bailey & Co., Inc.

MICRO-CRYSTALLINE WAXES
Bareco Oil Co.
Sun Oil Company

MOISTURE CONTENT CONTROL
Cambridge Instrument Co.
Williams Apparatus Co., Inc.

MOISTURE METERS
Hart-Moisture-Meters

MOTORS
Elliott Company

MOTORS AND GENERATORS
Fairbanks, Morse & Co.
General Electric Company
Reliance Electric & Engrg. Co.
Westinghouse Electric Corp.

NICKEL AND NICKEL ALLOYS
The International Nickel Co.

NOZZLES
Spray Engrg. Co.

PACKING BOXES
Johnson Corporation
The Moore & White Co.
Shartle Brothers Machine Co.

PAPER MACHINE DRIVES
The Bagley & Sewall Company
Black-Clawson Co.
Manchester Machine Co.
Rice Barton Corporation
Westinghouse Electric Corp.

PAPER MACHINES
The Bagley & Sewall Company
Beloit Iron Works
Bagley & Sewall Co.
Black Clawson Company
Downingtown Mfg. Co.
Gibbs-Brower Company, Inc.
Thomas W. Hall Co.
Lukenweld
Manchester Machine Co.
Moore & White Co.
Pusey & Jones Corp.
Rice Barton Corporation
J. J. Ross Company
Ross Paper Machy. Corp.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Smith & Winchester Mfg. Co.

PAPER MACHINES—LABORATORY
The Noble & Wood Machine Co.

PAPER MACHINE SLICES
Black Clawson Company
E. D. Jones & Sons Co.
The Moore & White Co.
Rice Barton Corporation
The Sandy Hill Iron & Brass Works
Valley Iron Works Co.

PAPER TUBE MACHINERY
Dietz Machine Works
Gibbs-Brower Company, Inc.
Thomas W. Hall Co.
Hudson Sharp Machine Co.
Jagenberg-Werke Akt. Ges.
Langston Co., Samuel M.

PARAFFINE WAXES
Sun Oil Company

PARAFFIN WAX EMULSIONS
American Cyanamid Co., Ind. Chem. Div.
Hercules Powder Co., Inc.
Nopco Chemical Co.

PASTING MACHINES
Beloit Iron Works
Black Clawson Company
Dilts Machine Wks.
Frank W. Egan & Co.
Gibbs-Brower Company, Inc.
Murray, D. J., Mfg. Co.

PAPER MILL CORES

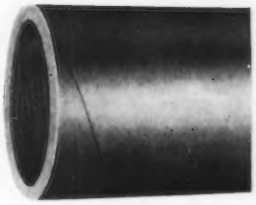
Made to SPECIFICATIONS

by SONOCO

MAKERS OF
Precision Paper Products

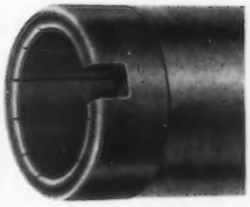
RHINO
NON-RETURNABLE

RHINO—an all purpose core for one time use that we have perfected into an extremely durable, tough, *non-returnable* paper mill core. Superior crushing strength. Made to all standard specifications of size and thickness.



DURO
RETURNABLE

DURO—a *returnable* paper mill core that more than meets the standard specifications. DURO cores are made standard 3⅛" I. D. equipped with SONOCO heavy duty open or closed notched metal ends to fit 3" shaft. SONOCO light duty metal ends, which protect inside of the core only, can be specified.



THE SONOCO HEAVY-DUTY METAL ENDS FOR RETURNABLE CORES

Made to take abuse. Notch strongly reinforced by heavy steel patch welded in place, which also gives adequate bearing surface on the notched portion of the core. Longitudinal ribs actually gear metal end to the core, making for a unified and exceptionally strong carrier for repeated use.

SONOCO
POWER THE WORLD
PAPER CARRIER
REG. U.S. PAT. OFF.

SONOCO PRODUCTS COMPANY

BRANTFORD ONT. | HARTSVILLE S. C. | MYSTIC CONN.

DEPENDABLE SOURCE OF SUPPLY

Moore and White Co.
Potdevin Machine Co.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Waldron Corp., John

PEBBLE MILLS
F. L. Smidth & Co.

pH METERS
Cambridge Instrument Co.
Thwing-Albert Instrument Co.

PIPE
Armco Drainage & Metal Products, Inc.
Babcock & Wilcox Co.
Biggs Boiler Works Co.
Crane Company
Grinnell Company
Michigan Steel Casting Co.
National Tube Co.
Walworth Company

PIPE FITTINGS
Armco Drainage & Metal Products, Inc.
Crane Company
Grinnell Company
Michigan Steel Casting Co.
Walworth Co.

PITCH CONTROL
American Cyanamid Company, Industrial Chemicals Division
General Dyestuff Corp.
Monsanto Chemical Company
National Aluminate Corp.
Nopco Chemical Co.
Rohm & Haas Co.

PLASTICIZERS
American Cyanamid Company, Industrial Chemicals Division
Aktivin Division, Heyden Chemical Corp.
B. F. Goodrich Chemical Co
Naugatuck Chemical Division of U. S. Rubber Co.
Nopco Chemical Co.
Rohm & Haas Co.

PLATERS
Gibbs-Brower Company, Inc.
Perkins & Son, Inc., B. F.

PLATES
Armco Steel Corp.
Babcock & Wilcox Co.
J. O. Ross Engrg. Corp.
Lukenweld Division
Lukens Steel Company
Timken Roller Bearing Co.

PLATING
Chromium Corp. of America

PLUGS
The Appleton Machine Co.
Black Clawson Company
E. D. Jones & Sons Co.
The Noble & Wood Machine Co.
Shartle Brothers Machine Co.

POPE TYPE REELS
Black-Clawson Co.
Egan, Frank W., & Co.
Manchester Machine Co.
Rice Barton Corporation

PRECISION SAMPLE CUTTER
Testing Machines, Inc.
Thwing-Albert Instrument Co.

PRESERVATIVES
E. I. du Pont de Nemours & Co.
General Dyestuff Corp.

PRESS ROLLS
Beloit Iron Works
Black-Clawson Co.
Goodrich, B. F., Company, Inc.
Manchester Machine Co.
Rice Barton Corporation

PRESSURE FILTERS
Holyoke Machine Co.

PRESSURE VESSELS
Biggs Boiler Works Co.
Chicago Bridge & Iron Co.
Combustion Engineering-Superheater, Inc.

PRESSES
Black Clawson Company
Dietz Machine Works
Farrel-Birmingham Co.
Gibbs-Brower Company, Inc.
Thomas W. Hall Co.
Hudson-Sharp Mch. Co.
Manchester Machine Co.
The Moore & White Co.
Potdevin Machine Co.
Rice Barton Corporation
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Valley Iron Works Co.
Waldron Corp., John
H. G. Weber & Co., Inc.
Williams Apparatus Co

PULLEYS
Black-Clawson Co.
Dodge Mfg. Corp.
Rice Barton Corporation

PULP CLASSIFIER
The Bauer Bros. Co.
Thwing-Albert Instrument Co.

PULP CLEANERS
Bird Machine Co.
Nichols Engrg. & Research Corp.

PULP STOCK VALVES
Crane Company
Record Fdy. & Mach. Co.
Rice Barton Research Corp.
Shartle Brothers Machine Co.

PULPERS
Apmew, Inc.
Bauer Brothers Co.
Cowles Company
Dilts Machine Works
E. D. Jones & Sons Co.
Midwest Fulton Mch. Co.
Morden Machines Co.
The Noble & Wood Machine Co.
Rice Barton Research Corp.
Shartle Brothers Machine Co.

PULPS
Brown Company
Bulkley, Dunton Pulp Co., Inc.
Gottesman & Co., Inc.
Lyddon & Co. (America), Inc.
Nordicus, Inc.
Parsons & Whittemore, Inc.
Perkins-Goodwin Co.
Price & Pierce, Ltd.
Pulp and Paper Trading Co.
Pulp Sales Corp.
Restigouche Co., Ltd.

PULP SCREENS
Bird Machine Co.
Trimbey Machine Works

PULPSTONES
Norton Company

PULP TESTERS
Williams Apparatus Co., Inc.

PULVERIZING MILLS
Combustion Engineering-Superheater, Inc.
Jeffrey Mfg. Co.
F. L. Smith & Co.

PUMPS
Apmew, Inc.
The Bagley & Sewall Company
Beloit Iron Works
Black Clawson Company
Buffalo Pumps, Inc.
Byron Jackson Co.
DeLaval Steam Turbine Co.
Downingtown Mfg. Co.
Fairbanks, Morse & Co.
Gibbs-Brower Company, Inc.
Johnson Corp.
Moore & White Co.
The Noble & Wood Machine Co.
Nash Engineering Co.
Roots Connersville Blower Corp.
J. J. Ross Company
Ross Paper Machy. Corp.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Smith & Winchester Mfg. Co.
Warren Steam Pump Co.

RADIANT BURNERS
Red-Ray Mfg. Co., Inc.

RAG COOKING PROCESSES
The Kinsley Chemical Company
General Dyestuff Corp.
Rohm & Haas Co.

RAG CUTTERS
Gibbs-Brower Company, Inc.
B. F. Perkins & Son, Inc.
Taylor-Stiles & Co.

RECOVERY SYSTEMS
Babcock & Wilcox Co.
Chicago Bridge & Iron Co.
Combustion Engineering-Superheater, Inc.
Moore & White Co.
D. J. Murray Mfg. Co.
Pusey & Jones Corp.
Ross Engineering Corp., J. O.
Valley Iron Works Co.

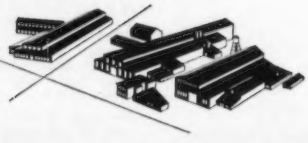
REELS
The Appleton Machine Co.
The Bagley & Sewall Company
Beloit Iron Works
Black Clawson Company
Dilts Machine Works (Kohler Systems)
Egan, Frank W., & Co.
Downingtown Mfg. Co.
Hudson-Sharp Mch. Co.
Manchester Machine Co.

Efficient Design
Careful Accurate Fabrication

Comprehensive Service

GOSLIN-BIRMINGHAM

The four most important steps in modernization or expansion of your



BLACK LIQUOR EVAPORATOR INSTALLATIONS

GB GOSLIN-BIRMINGHAM MANUFACTURING CO., Inc.
BIRMINGHAM, ALABAMA
CHICAGO: F. M. deBeers and Associates, 20 North Wacker

Moore & White Co.
Rice Barton Corporation
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
The Smith & Winchester Mfg. Co.
Waldron, John, Corp.

REFINERS
Appleton Machine Co.
Bahr Brothers Mfg. Co.
Bauer Brothers Co.
Dilts Machine Works
Gibbs-Brower Company, Inc.
Hermann Mfg. Co.
E. D. Jones & Sons Co.
Morden Machines Co.
Murray, D. J., Mfg. Co.
The Noble & Wood Machine Co.
Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Sprout Waldron & Co., Inc.
Sutherland Refiner Corp.
Valley Iron Works

REGULATORS
Apmew, Inc.
Bird Machine Company
General Electric Co.
Improved Paper Machinery Corp.
Johnson Corp.
Meyer Governor Co.
Shartle Brothers Machine Co.
Taylor Instrument Companies
Trimbey Machine Works
Westinghouse Electric Corp.

RESINS
American Cyanamid Company, Plastics & Resins Division
The Dow Chemical Company
B. F. Goodrich Chemical Co.
The Goodyear Tire & Rubber Company
Hercules Powder Co.
Monsanto Chemical Company
Naugatuck Chemical Division of U. S. Rubber Co.
Nopco Chemical Co.
Plaskon Division, Libbey-Owens-Ford Glass Co.
Reichhold Chemicals, Inc.
Rohm & Haas Co., Resinous Products Div.

ROLLS
Appleton Machine Co.
The Bagley & Sewall Company
Beloit Iron Works
Black Clawson Company
Dilts Machine Works
Downingtown Mfg. Co.
Frank W. Egan & Co.
Farrel-Birmingham Co.
Gibbs-Brower Company, Inc.
B. F. Goodrich Co.
Holyoke Machine Co.
Lindsay Wire Weaving Co.
Lobdell United Co.
Manchester Machine Co.
The Moore & White Co.
D. J. Murray Mfg. Co.
The Noble & Wood Machine Co.
Perkins, B. F., & Sons Co.
Pusey & Jones Corp.
J. J. Ross Company
Rice Barton Corporation
Ross Paper Machy. Co.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Smith & Winchester Mfg. Co.
Stowe-Woodward Inc.
U. S. Rubber Co.
Valley Iron Works Co.
Waldron Corp., John
Wheeler Roll Co.

ROLL COVERS
The Goodyear Tire & Rubber Company

ROLL HANDLING EQUIPMENT
Dilts Machine Works (Kohler Systems)

ROLL STANDS
Cameron Machine Co.
Dilts Machine Works (Kohler Systems)
Frank W. Egan & Co.
Johnstone Engrg. & Mch. Co.
Moore & White Co.
Potdevin Machine Co.
The Sandy Hill Iron & Brass Works
John Waldron Corp.
H. G. Weber & Co., Inc.

ROLL WRAPPERS
Lawton Company

ROPE CARRIERS
Black Clawson Co.
The Moore & White Co.
Rice Barton Corporation
The Sandy Hill Iron & Brass Works

ROTARY KILNS
Biggs Boiler Works Co.
F. L. Smidth & Co.

ROTARY STEAM JOINTS
Johnson Corp.
The Moore & White Co.
Rice Barton Corporation
Shartle Bros. Mch. Co.

RUBBER LINING
B. F. Goodrich Co.

RUBBER PRODUCTS
The Goodyear Tire & Rubber Company

SALT CAKE
Ethyl Corporation

SATURANTS
B. F. Goodrich Chemical Co.

SATURATING MACHINES
Dilts Machine Works
Frank W. Egan & Co.
Gibbs-Brower Company, Inc.
Moore & White Co.
Potdevin Machine Co.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Waldron Corp., John
Weber, Herman G.

SAVEALLS
Bird Machine Company
Chicago Bridge & Iron Co.
Improved Paper Machinery Corp.

SAWS
Simonds Saw & Steel Co.

SCALES
Merrick Scale Mfg. Co.
Testing Machines, Inc.

SCREEN PLATES
Bird Machine Company
Fitchburg Screen Plate Co.
Magnus Metal Corp.
Morey Paper Mill Supply Co.
Testing Machines, Inc.
Union Screen Plate Co.

SCREENS
Appleton Wire Works
Appleton Machine Company
The Bagley & Sewall Company
Bird Machine Company
Carthage Machine Co.
Dilts Machine Works, Inc.
Downingtown Mfg. Co.
Gibbs-Brower Company, Inc.
E. D. Jones & Sons Co.
Moore & White Co.
D. J. Murray Mfg. Co.
J. J. Ross Company
Ross Paper Machy. Co.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Trimbey Machine Works
Valley Iron Works Co.

SHAKE STICKS
Westinghouse Electric Corp.

SHEET MACHINES
Gibbs-Brower Company, Inc.
Thomas W. Hall Co.
Hermann Mfg. Co.
Valley Iron Works Co.
Williams Apparatus Co., Inc.

SHEET MACHINES—LABORATORY
The Noble & Wood Machine Co

SHEETERS
Jagenberg-Werke Akt. Ges.

SHOWER PIPES
Bird Machine Company
Black-Clawson Co.
Downingtown Mfg. Co.
Moore & White Co.
Sandusky Fdy. & Mch. Co.
Shartle Brothers Machine Co.
Smith & Winchester Mfg. Co.

SHREDDERS
Bauer Brothers Co.
Carthage Machine Co.
Gibbs-Brower Company, Inc.
Jeffrey Mfg. Co.

SIZE PRESSES
Black-Clawson Co.
Manchester Machine Co.
Rice Barton Corporation

SIZING
American Bitumuls & Asphalt Co.
American Cyanamid Company, Industrial Chemicals Division
The Dow Chemical Company
du Pont, E. I., de Nemours & Co.
Glidden Company
Hercules Powder Co.
The Hubinger Co.
Monsanto Chemical Company
National Aluminate Corp.
Nopco Chemical Co.
Wyandotte Chemicals Corp., Michigan Alkali Div.

...guaranteed to clarify white water to less than ½ pound filterable solids per 1000 gallons

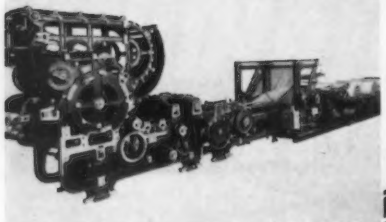
Write for complete details

BULKLEY, DUNTON PROCESSES, Inc.

295 Madison Avenue
New York 17, N. Y.

Pacific Coast—Security Building
Pasadena, Calif.

WEBER BAG MACHINERY



S.O.S., SATCHEL BOTTOM CELLOPHANE

WRITE! FOR DETAILS

We are also interested in your special engineering or designing problems. Write us anytime . . . no obligation.

—And, miscellaneous equipment such as automatic photocell localizing equipment and compensators for synchronizing print and cut-off for various types of bag machines, sheeters, edge alignment control, tensioning, unwind roll stands, etc. Ask us for complete details . . . Weber Bag Machinery is standard equipment throughout the world.

Member, Packaging Machinery Manufacturers' Institute.

INTERNATIONALLY KNOWN

H. G. WEBER & COMPANY, INC.

UNIVERSALLY ACCEPTED

ENGINEERS AND MANUFACTURERS

KIEL • WISCONSIN

FIRST AID for PAPER SALESMEN

Col. Thomas F. Smith, Pres. Louisville Paper Company, who gave his salesmen Wheelwright's *Practical Paper Technology*, received this Memo. from E. P. Wells.

"I have received, read and admired "Practical Paper Technology". I intend to make it a regular part of my working kit and expect to quote it and use it for reference."

Written in non-technical language, this is a book which the paper salesman, the printer or converter, or others, interested in paper—its properties and uses will find helpful.

In durable paper cover, $2.25; Library Edition, cloth binding, copies, $3.00. Twenty-five cents extra for either edition for foreign delivery, Canada excepted.

LOCKWOOD TRADE JOURNAL CO., INC.

15 West 47th St., New York, N. Y.

J. E. SIRRINE CO.

Greenville, South Carolina

Engineers

PAPER & PULP MILLS • WASTE DISPOSAL • TEXTILE MILLS • APPRAISALS • WATER PLANS • STEAM UTILIZATION • STEAM POWER PLANTS • HYDRO-ELECTRIC • REPORTS

SIZING TESTER
W. & L. E. Gurley
Testing Machines, Inc.
Thwing-Albert Instrument Co.
Williams Apparatus Co., Inc.

SLIME CONTROL
Buckman Laboratories, Inc.
Buckman Laboratories of Canada, Ltd.
Buckman Laboratories, Inc.
The Dow Chemical Company
E. I. du Pont de Nemours & Co.
General Dyestuff Corp.
Magnuson Products Corp.
Monsanto Chemical Co.
National Aluminate Corp.
Rohm & Haas Co.
Vanderbilt Co., R. T.
Wyandotte Chemicals Corp., Michigan Alkali Div.

SLITTERS
The Bagley & Sewall Company
Black Clawson Company
Cameron Machine Co.
Carthage Machine Co.
Clark-Aiken Co.
Dietz Machine Works
Dilts Machine Works
Downingtown Mfg. Co.
Dusenbery Co., Inc.
Frank W. Egan & Co.
Gibbs-Brower Company, Inc.
Graphic Arts International Corp.
Thomas W. Hall Co., Inc.
Hamblet Machine Co.
Hudson-Sharp Mch. Co.
Improved Paper Machinery Corp.
Jagenberg-Werke Akt. Ges.
Langston Co., Samuel M.
Moore & White Co.
D. J. Murray Mfg. Co.
Rice Barton Corporation
J. J. Ross Company
Ross Paper Machy. Co.
The Sandy Hill Iron & Brass Works
Smith & Winchester Mfg. Co.
Valley Iron Works Co.
Waldron Corp., John

SMOKE STACKS
Chicago Bridge & Iron Co.

SOFTNESS-STIFFNESS TESTER
W. & L. E. Gurley
Testing Machines, Inc.
Thwing-Albert Instrument Co.

SOLUBLE OILS
American Cyanamid Company, Industrial Chemicals Division
General Dyestuffs Corp.
Nopco Chemical Co.

SPECIAL MACHINERY
Biggs Boiler Works Co.
Dilts Machine Works
Egan, Frank W., & Co.
Manchester Machine Co.
The Noble & Wood Machine Co.
Rice Barton Corporation
The Sandy Hill Iron & Brass Works
John Waldron Corp.

SPEED REDUCERS
Dodge Mfg. Corp.

SPLICING TISSUE
Williams-Gray Co.

STAINLESS STEEL
Armco Steel Corp.
Michigan Steel Casting Co.
U. S. Steel Corp.

STARCH
Clinton Foods, Inc.
The Hubinger Co.
National Starch Products Inc.
Stein-Hall

STEAM JOINTS
The Moore & White Co.
Rice Barton Corporation
Shartle Bros. Mch. Co.

STEAM SPECIALTIES
Babcock & Wilcox Co.
Combustion Engrg. Co., Inc.
Johnson Corp.

STEEL
Armco Steel Corp.
Carnegie Illinois Steel Co.
Lukens Steel Company
D. J. Murray Mfg. Co.
The Sandy Hill Iron & Brass Works
U. S. Steel Corp.

STEEL, CLAD
Babcock & Wilcox Co.
Lukens Steel Company

STEEL TANKS
The Biggs Boiler Works Co.
Chicago Bridge & Iron Co.
The Sandy Hill Iron & Brass Works

STRETCH TESTER
Thwing-Albert Instrument Co.

STOKERS
Detroit Stoker Co.

STUFF CHESTS
Downingtown Mfg. Co.
E. D. Jones & Sons Co.
Moore & White Co.
The Noble & Wood Machine Co.
Rice Barton Corporation
Shartle Brothers Machine Co.
Valley Iron Works Co.

SUCTION BOX COVERS
Westinghouse Electric Corp.

SUCTION BOXES
Black Clawson Company
Downingtown Mfg. Co.
E. D. Jones & Son Co.
Manchester Machine Co.
Moore & White Co.
Rice Barton Corporation
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.

SUCTION ROLLS
Beloit Iron Works
Manchester Machine Co.

SULPHUR
Texas Gulf Sulphur Co.

SULPHUR BURNERS
Valley Iron Works Co.

SULPHUR DIOXIDE
American Cyanamid Company, Calco Chemical Div.
Virginia Smelting Co.

SUPERCALENDERS
The Appelton Machine Co.
B. F. Perkins & Son, Inc.

SYNTHETIC LATICES
American Cyanamid Company, Industrial Chemicals Division
B. F. Goodrich Chemical Co.
The Goodyear Tire & Rubber Company
Naugatuck Chemical Division of U. S. Rubber Co.
Nopco Chemical Co.

SYNTHETIC RESINS
American Cyanamid Co., Ind. Chem. Div.
Hercules Powder Co., Inc.
Rohm & Haas Co.

SYPHONS
Cram & Associates

TAKE OFF UNITS
Dilts Machine Works (Kohler Systems)

TALC
American Cyanamid Company, Industrial Chemicals Division
Vanderbilt Co., R. T.

TANKS
Biggs Boiler Works Co.
Chicago Bridge & Iron Co.
Kalamazoo Tank & Silo Co.
The Noble & Wood Machine Co.
B. F. Perkins & Sons, Inc.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Stebbins Engrg. Co.

TEARING TESTERS
Thwing-Albert Instrument Co.
Testing Machines, Inc.

TENSILE TESTERS
Thwing-Albert Instrument Co.
B. F. Perkins & Son, Inc.
Scott Testers Inc.
Testing Machines, Inc.
A. van der Korput

THICKENERS, DECKERS AND SAVEALLS
The Appleton Machine Co.
Bird Machine Company
Carthage Machine Co.
Chicago Bridge & Iron Co.
Dilts Machine Works
Downingtown Mfg. Co.
Improved Paper Machinery Corp.
Moore & White Co.
D. J. Murray Mfg. Co.
Ross Paper Machy. Corp.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Valley Iron Works Co.

TIRES
Stroh Process Steel Co.

TITANIUM
American Cyanamid Co., Calco Chemical Div.
E. I. du Pont de Nemours & Co.
Titanium Pigment Co.
R. T. Vanderbilt Co.

TOOLS
Walworth Company

TRACTORS AND TRUCKS
Elwell Parker Elec. Co.
Towmotor Corp.

TRANSMISSIONS
Alexander Bros. Belting Co.
Dodge Mfg. Corp.
Jeffrey Mfg. Co.
Lovejoy Flexible Coupling Co.
More Chain Co.

TRAPS
Crane Co.
Johnson Corporation
Shartle Bros. Mch. Co.

TUBE MILLS
F. L. Smidth & Co.

TUBES
Babcock & Wilcox Co.
National Tube Co.

TUBING MACHINES
Dilts Machine Works

TUBING, MECHANICAL
National Tube Co.

TUBS
Biggs Boiler Works Co.
The Noble & Wood Machine Co.
Shartle Brothers Machine Co.
Valley Iron Works Co.

TURBINES
De Laval Steam Turbine Co.
General Electric Company
Westinghouse Electric Corp.

UNWINDERS
Dilts Machine Works (Kohler Systems)
Egan, Frank W., & Co.
Rice Barton Corporation
John Waldron Corp.

USED EQUIPMENT
Gibbs-Brower Co.
Thomas W. Hall Co.
J. J. Ross Company
Ross Paper Machy. Co.
Shartle Brothers Machine Co.

V-BELTS
Dodge Mfg. Corp.
Goodrich, B. F., Company, Inc.

VALVES
The Bagley & Sewall Company
Crane Company
DeZurick Shower Co.
Dilts Machine Works
Fabri Valve Co. of America
E. D. Jones & Sons Co.
Magnus Metal Corp.
D. J. Murray Mfg. Co.
The Noble & Wood Machine Co.
William Powell Co.
Record Fdy. & Mch. Co.
Rice Barton Research Corp.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Valley Iron Works Co.
Walworth Company

VATS
Biggs Boiler Works Co.
Black-Clawson Co.
Beloit Iron Works
Rice Barton Corporation

WASHERS
The Bagley & Sewall Company
Downingtown Mfg. Co.
Gibbs-Brower Company, Inc.
Improved Paper Machinery Corp.
E. D. Jones & Sons Co.
Moore & White Co.
The Noble & Wood Machine Co.
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Valley Iron Works Co.

WASTE TREATING EQUIPMENT
Hungerford & Terry, Inc.
Jeffrey Mfg. Co.

WATER CONDITIONING
Calgon, Inc.
General Dyestuff Corp.
Hungerford & Terry, Inc.
National Aluminate Corp.
The Permutit Company
The Sandy Hill Iron & Brass Works

WATER DISPERSIONS
American Cyanamid Company
Industrial Chemicals Division
Naugatuck Chemical
Division of U. S. Rubber Co.
Rohm & Haas Co., Resinous Products Div.

WATER FILTERS
Bird Machine Co.
Holyoke Machine Co.
Improved Paper Machinery Corp.

WATER FINISH EQUIPMENT
The Permutit Company

WATER PENETRATION TESTER
Thwing-Albert Instrument Co.
Williams Apparatus Co., Inc.

WATER SOFTENERS
Hungerford & Terry, Inc.
Wyandotte Chemicals Corp.
Michigan Alkali Div.

WATER TREATMENT
Dorr Company

WATER VAPOR CUPS
Thwing-Albert Instrument Co.

WAXING MACHINERY
Black Clawson Company
Dilts Machine Works
Frank W. Egan & Co.
Gibbs-Brower Company, Inc.
The Mayer Machine Co.
Potdevin Machine Co.
Shartle Brothers Machine Co.
Waldron Corp., John
Weber, Herman G.

WEB TENSION CONTROL
Dilts Machine Works (Kohler Systems)
Egan, Frank W., & Co.
John Waldron Corp.

WELDING EQUIPMENT
General Electric Company
Walworth Company
Westinghouse Electric Corp.

WET MACHINES
The Bagley & Sewall Company
Black Clawson Company
Carthage Machine Co.
Downingtown Mfg. Co.
Improved Paper Machinery Corp.
Moore & White Co.
The Noble & Wood Machine Co.
Pusey & Jones Company
Rice Barton Corporation
The Sandy Hill Iron & Brass Works
Shartle Brothers Machine Co.
Smith & Winchester Mfg. Co.
Valley Iron Works Co.

WET STRENGTHENING AGENTS
American Cyanamid Co., Ind. Chem. Div.
Hercules Powder Co., Inc.
Plaskon Div. Libbey-Owns-Ford Glass Co.
Reichhold Chemicals, Inc.
Rohm & Haas Co.

WETTING AGENTS
American Cyanamid Company Industrial Chemicals Division
Diamond Alkali Co.
General Dyestuff Corp.
Monsanto Chemical Company
Nopco Chemical Co.
Plaskon Division Libbey-Owens-Ford Glass Co.
Rohm & Haas Co.
Wyandotte Chemicals Corp. Michigan Alkali Div.

WHITE WATER TREATING EQUIPT.
Bird Machine Co.
Hungerford & Terry, Inc.
The Sandy Hill Iron & Brass Works

WINDERS & REWINDERS
The Bagley & Sewall Company
Beloit Iron Works
The Appleton Machine Co.
Black Clawson Company
Kohler Systems
Cameron Machine Co.
Dietz Machine Works
Dilts Machine Works
Downingtown Mfg. Co.
Dusenbery Co., Inc.
Frank W. Egan & Co.
Gibbs-Brower Company, Inc.
Thomas W. Hall Co.
Hudson-Sharp Mch. Co.
Jagenberg-Werke Akt. Ges.
Langston Co., Samuel M.
Manchester Machine Co.
Moore & White Co.
Potdevin Machine Co.
Pusey & Jones Corp.
Rice Barton Corporation
J. J. Ross Company
Ross Paper Machy. Co.
The Sandy Hill Iron & Brass Corp.
Smith & Winchester Mfg. Co.
Waldron Corp., John

WINDING ROLL CHANGERS
Dilts Machine Works (Kohler Systems)
Egan, Frank W., & Co.
Waldron, John, Corp.

WIRE BRUSHES
M. W. Jenkins Sons, Inc.
Williams-Gray Co.

WIRE GUIDES
Black-Clawson Co.
Gilbert & Nash

WIRES
Appleton Wire Works
Eastwood-Nealley Corp.
International Wire Works
Lindsay Wire Weaving Co.
Williams-Gray Co.

WOOD SPLITTERS
The Appleton Machine Co.
Carthage Machine Co.
Manchester Machine Co.

Test and Record Stiffness of Most Papers and Paper Boards in 21 Seconds

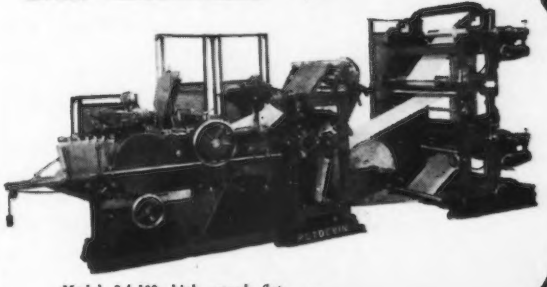
That's all it takes to measure paper up to 0.25" thick with the motorized Gurley Stiffness Tester. It easily handles tissue, newsprint, book, bonds, ledgers, industrial papers, cardboard and carton stocks, and permits a wide range of readings from 1 to 3,358,720.

More than 300 of these aids to faster, more efficient measurement are used in leading mills and laboratories.

Write for Bulletin No. 1400. It describes the motor-driven and hand-operated models as well as other Gurley paper-testing instruments. W. & L. E. Gurley, 520 Fulton Street, Troy, New York.

POTDEVIN
Flat and Square (Tucked)
PAPER BAG MACHINES

60 years of dependable service



Model 2A-102 high speed flat and square multi-color printing bag machine.

POTDEVIN Flat and Square machines make grocery, notion, millinery, shipping container and large specialty bags. Each machine is adjustable to make a large range of sizes. POTDEVIN Aniline Printing Presses can be directly connected to most POTDEVIN Bag Machines to produce multi-color bags. Attachments available for pre-printed papers, multi-wall, hole-punching, etc. Over 200 modern, high speed bag machine models for profitable operation.

Consult our engineers on any problem. No obligation. Literature on request.

POTDEVIN MACHINE CO.
223 North Street
Teterboro, N. J.

Designers and manufacturers of equipment for Bag Making, Printing, Coating, Laminating, Gluing and Labeling.

INDEX TO ADVERTISERS

REGULAR SECTION

A

Adams, R. P., Co. 32
Alan Wood Steel Co. ..... —
Alexander Brothers 89
Amercoat Corp. ..... —
American Bitumuls & Asphalt Co. ..... —
American Cyanamid Co., Calco Chemicals Div. 79
American Cyanamid Co., Industrial Chemicals Div. ..... —
American Difibrator, Inc. ..... —
American Steel & Wire Co. .. —
Antara Chem. Div., General Dyestuff Corp. ..... —
Appleton Woolen Mills 4
APW Products Co. 68
Armco Drainage & Metal Products ..... —
Armco Steel Corp. 20
Armstrong Machine Works 95
Askania Regulator Co. ..... —

B

Babcock & Wilcox Co. 81
Bahr Bros. Mfg. Co. ..... —
Bareco Oil Co. ..... —
Barrell, Wm. L., Co. 73
Beckman Instruments, Inc. .... —
Birmingham Committee of 100. —
Bixby, R. W., Inc. 116
Bowsher, N. P., Co. ..... —
Bulkley Dunton Processes, Inc. 125
Byron Jackson Co. ..... —

C

Calgon, Inc. 21
Cambridge Instrument Co. .... —
Cameron Machine Co. 134
Carthage Machine Corp. 112
Chicago Bridge & Iron Co. 129
Chromium Corp. of America .. 16
Ciba Company ..... —
Classified Advertising 116
Clearing House 116
Crane Co. ..... —
Crucible Steel Corp. of America —

D

Davis Co., Frank H. ..... —
Deitz Machine Works 114
Detroit Stoker Co. 77
DeZurik Shower Co. 18
Diamond Alkali Co. ..... —
Dodge Manfg. Co. ..... —
Dow Chemical Co. ..... —
Draper Brothers Co. 105
du Pont, E. I., de Nemours & Co. Electrochemical Dept. ..... —
du Pont, E. I., de Nemours & Co. Dyestuffs Dept. 23
du Pont, E. I., de Nemours & Co. Polychemicals Dept. ..... —
Dusenbery Co., Inc. ..... —

E

Ebasco Services, Inc. ..... —
Elixman Paper Core Co. ..... —
English China Clays Sales Corp. —

F

Fabri Valve of America ..... —
Ferguson, The H. K., Co. 107

G

Geigy Co. ..... —
General Dyestuff ..... —
General Electric Co. ..... —
Gibbs-Brower Co. ..... —
Gilbert & Nash Co. ..... —
Glidden Co. ..... —
Goldman, G. B., Paper Co. 118
Goodrich Chemical Co. 24
Goodrich Co., B. F. ..... —
Goodyear Tire & Rubber Co. .. —
Goslin-Birmingham Mfg. Co. .. 124
Gottesman & Co. ..... Front Cover
Grinnell Co., Inc. ..... —
Gruendler Crusher & Pulverizer Co. ..... —
Gurley, W., & L. E. 127

H

Hamblet Machine Co. ..... —
Hamersley Mfg. Co. ..... —
Hardinge Co., Inc. 98
Heinrich, H. H., Co. ..... —
Heyden Chemical Co. ..... —
Holyoke Machine Co. 6
Hooker Electrochemical Co. ... —
Huber, J. M., Corp. 14
Hubinger Co., The 119
Hungerford & Terry, Inc. ..... —
Huyck, F. C., & Sons 8

I

International Nickel Co. ..... —

J

Jackson & Chruch Co. 7
Jeffrey Mfg. Co. 30
Jenkins, M. W., Sons, Inc. ... 15
Johnson Corp., The ..... —
Johnson, Alvin H., & Co. .... —
Jones, E. D., & Sons Co. 71

K

Knox Woolen Co. 114
Koppers Co., Inc. 25

L

Langston, Samuel M., Co. ..... —
Lobdell-United Co. 9
Lodding Engineering Co. ..... —
Lukens Steel Co. ..... —
Lyddon Co. 111

M

Magnus Metal Div., Nat. Lead Co. 114
Main, Charles T., Inc. 106
Manheim Mfg. & Belting Co. . 85
Mead Sales Co., The ..... —
Meincke, A. M., & Son ..... —
Meisel Press Mfg. Co. ..... —
Mercer Paper Tube Co. 108
Merrick Scale Co. ..... —
Michigan Steel Casting Co. 106
Midwest Fulton Machine Co. .. —
Minneapolis-Honeywell Regulator Co. ..... —
Moorhead Electrical Machinery —
Morden Machines Co. 75
Morningstar, Nicol, Inc. 99
Murray, D. J., Mfg. Co. 115

N

Nash Engineering Co. ..... —
National Aluminate Corp. ..... —
National Aniline Div., Allied Chem. & Dye Corp. ..... —
National Starch Products, Inc. Back Cover
National Tube Co. ..... —
Naugatuck Chem. Div., U. S. Rubber Co. ..... —
Niagara Alkali Co. ..... —
Nichols Engrg. & Research Co. 93
Nopco Chemical Co. 67
Nordicus, Inc. ..... 104 & 108
Norton Co. 112

O

O'Donoghue, Roderick 106
Oldbury Electro Chemical Co. . 113
Owens-Corning Fibreglas Corp. —

P

Pandia, Inc. 91
Paper Machy., Ltd. 120
Parsons & Whittemore 111
Pennsylvania Salt Mfg. Co. . 28
Perkins, B. F., & Sons Co. ... —
Perkins Goodwin Co. ..... —
Petroleum Specialties Co. ..... —
Pioneer Paper Stock Co. 112
Poirier Control Co. ..... —
Potdevin Machine Co. 127
Powell, William, Co. 17
Price & Pierce, Ltd. 100
Pulp & Paper Trading Co. .... —
Pusey & Jones Corp., The 13

R

Railway Supply & Mfg. Co. ... —
Raymond, Chas. P., Service, Inc. 116
Reading Crane & Hoist Co. .... —
Record Fdy. & Machine Co. ... 113
Restigouche Co., Ltd. 103
Rogers, S. C., & Co. 115
Rohm & Haas Co. ..... —
Roosevelt Paper Co. ..... —
Roots-Connersville Blower Corp. 101
Ross, J. J., Co. 117
Ross Paper Machinery Co. .... —
Rust Engineering Co. 106

S

Seaboard Air Line R.R. Co. ... —
Shuler & Benninghofen 12
Simonds Saw & Steel Co. 3
Sinclair Refining Co. 69
Sirrine, J. E., Co. 126
SKF Industries ..... —
Smith & Winchester Mfg. Co. 109
Socony Vacuum Oil Co., Inc. .. —
Sonoco Products Co. 123
Spray Engineering Co. 106
Stroh Process Steel Co. 102
Sun Oil Co. ..... —
Swenson Evaporator Co. ..... —

T

Taylor Instrument Cos. ..... —
Taylor Stiles & Co. 121
Texas Co., The ..... —
Texas Gulf Sulphur Co. ..... —
Thiele Kaolin Co. 22
Thomas Paper Stock Co. 113
Thwing-Albert Instrument Co. . 104
Tide Water Assoc. Oil Co. .... —
Timken Roller Bearing Co. .... —
Titanium Pigment Corp. ..... —
Torrington Co., Inc. 10
Towmotor Corp. 26
Tracerlab, Inc. ..... —

U

Union Screen Plate Co. ..... —
United Carbon Co., Inc. ..... —
U. S. Rubber Co. 29

V

Vanderbilt, R. T., Co. ..... —
Van der Korput, A. ..... —
Virginia Smelting Co. 122

W

Waterbury Felt Co. ..... —
Weber, H. G., & Co., Inc. 126
Wellman Engineering Co. .... —
West Disinfecting Co. ..... —
Western Precipitation Corp. ... —
Westinghouse Electric Corp. ... —
West Virginia Pulp & Paper Co. 114
Weyerhaeuser Timber Co. 27
Whiting Corp. ..... —
Williams Gray Co. 113

INDEX TO ADVERTISERS

SUPERINTENDENTS SECTION

A

Amalgamated Chemical Co. 150
Apmew, Inc. 142
Appleton Machine Co., The 134 & 135
Appleton Wire Works, Inc. ... 2
Asten-Hill Mfg. Co. 17

B

Bagley & Sewall Co. 110
Bailey Meter Co. 97
Bailey, R. N., & Co. 138
Bauer Bros. Co. 148
Beloit Iron Works 51
Biggs Boiler Works Co. 11
Bird Machine Co. 23
Black-Clawson Co. 81
Blaw-Knox Co. ..... 150 & 155
Bolton Co., John W. 47
Brown Co. 117
Buckman Laboratories 4
Buffalo Pumps, Inc. 152

C

Carnegie-Illinois Steel Corp 12 & 13
Chemipulp Process, Inc. 152
Clark-Aiken Co. 143
Clinton Foods, Inc. 144
Columbia-Southern Chem. Corp. 95
Combustion Engineering - Superheater, Inc. 46
Cowles Co., Inc. 73
Cram, H. G., & Assoc. 152

D

De Laval Steam Turbine Co. .. 70
Denver Equipment Co. 40
Dorr Company 28
Downingtown Mfg. Co. 129
du Pont, E. I., de Nemours & Co. Grasselli Chem. Dept. 67, 83 & 147

E

Eastwood Nealley Corp. 154
Egan, Frank W., & Co. 20
Elwell Parker Elec. Co. 18
Elliott Company 15
Ethyl Corporation 155

F

Farrell-Birmingham Co., Inc. .. 61
Fitchburg Screen Plate Co. ... 154

G

Graton & Knight Co. 145

H

Hart Moisture Meters 155
Hayden Wire Works 140
Hercules Powder Co. 48
Hermann Mafg. Co. 156
Hudson-Sharp Machine Co. ... 146
Hydro-Silica Corp. 140

I

Improved Paper Machy. Corp.. 27
International Wire Works 140

J

Jamar-Olmen Co. 59
Jones, E. D., & Sons Co. 137

K

Kalamazoo Tank & Silo Co. .. 151
Kinsley Chemical Co. 152

L

Lawton, C. A., Company 138
Libbey-Owens-Ford Glass Co... 131
Lindsay Wire Weaving Co. ... 136
Lockport Felt Co. 149
Lynch Corp. 86

M

Magnuson Products Co. 134
Manchester Machine Co. 133
Meyer Governor Co. 154
Meyer, C. R., & Sons Co. 152
Mixing Equipment Co. 115
Monsanto Chemical Co. 91
Moore & White Co. 139
Morey Paper Mill Supply Co... 10
Morse Chain Company 120
Mount Hope Machinery Co. .. 153

N

Noble & Wood Machine Co. .. 127

O

Oliver United Filters Inc. 109
Orr Felt & Blanket Co. 144

P

Pittsburgh Piping & Equip. Co. 106
Plank, Jos. J., & Co. 138
Plaskon Div., Libbey-Owens-Ford 131
Pulp Sales Corp. ..... 4th Cover

R

Red Ray Manufacturing Co., Inc. 146
Reichhold Chemicals, Inc. 8
Reliance Elec. & Engrg. Co. .. 9
Research Corp. 52
Rice Barton Research Corp. .. 65
Ros, J. O., Engrg. Co. 14

S

Sandusky Fdy. & Mch. Co. ... 98
Sandy Hill Iron & Brass Works ..... 118 & 119
Sinclair Company 150
Smidth, F. L., & Co. 141
Stein Hall 151
Stebbins Engrg. Co. 157
Stowe Wodward Co. 101
Sutherland Refiner Corp. 105

T

Tennessee Coal, Iron & R. R. Co. ..... 12 & 13
Testing Machines, Inc. 150
Trimbey Machine Wks. 16

U

United States Steel Export Co. ..... 12 & 13
United States Steel Supply Co. ..... 12 & 13
U. S. Steel Co. ..... 12 & 13

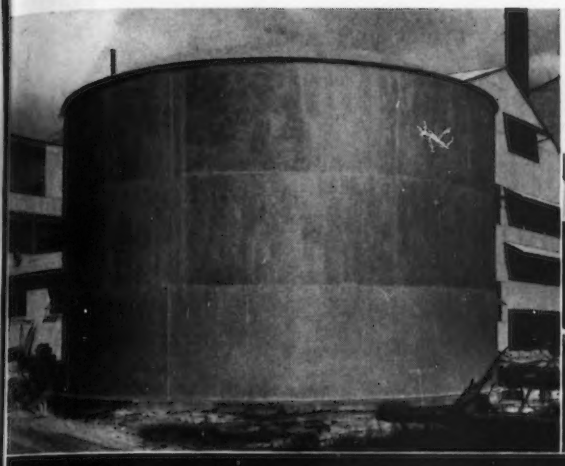
V

Vapo Systems Company 155
Valley Iron Works Co. 93

W

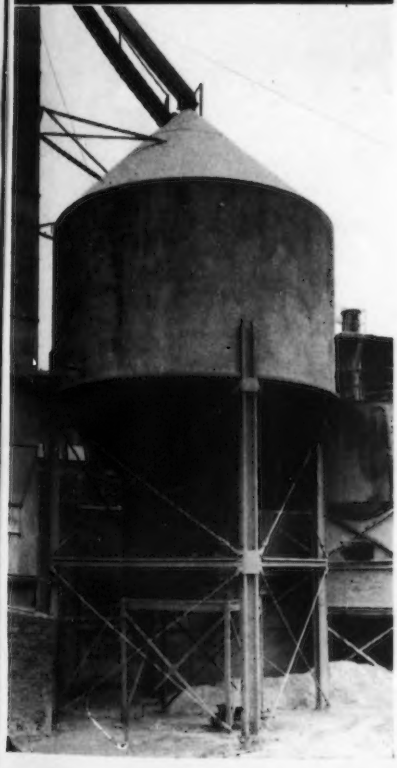
Waldron John, Corp. 148
Walworth Co. 30
Warren Steam Pump Co. 38
Wheeler Roll Co. 154
Williams Apparatus Co. 156
Wisconsin Wire Works 142
Wyandotte Chemicals Corp. ... 6

HUGHES PRINTING CO.
EAST STROUDSBURG, PA.



HORTON STRUCTURES

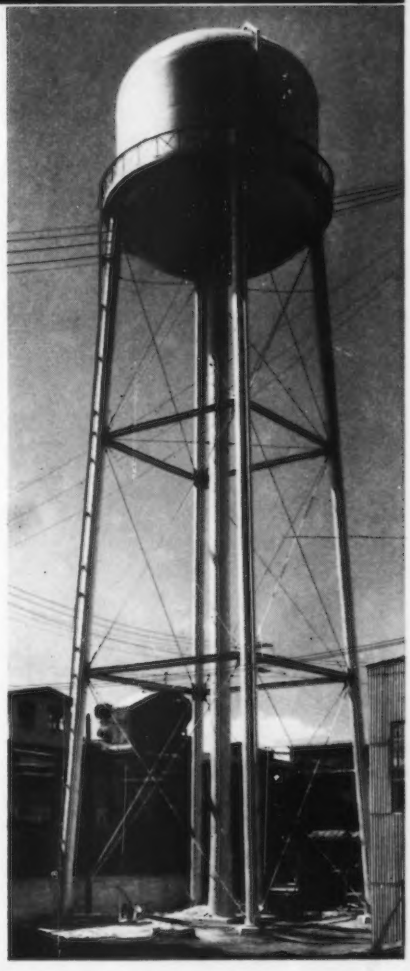
Specially Built to Fit Your Specifications



● Horton sulphate and sulphite digesters, lime tanks, accumulators, seal tanks, liquor tanks, Marx Savealls, and the many other types of steel plate structures required by the pulp and paper industry are specially built by Chicago Bridge & Iron Company to fit *your* specifications.

Our facilities for fabricating steel and corrosion-resistant materials are complete. We are equipped to do stress-relieving and x-raying in accordance with the governing code and recently we enlarged our phosphoric pickling facilities. Our four U. S. plants are strategically located to give you efficient service, wherever your plants may be.

Write our nearest office for further information.



● *Left above: 36-ft. diam. by 22-ft. cone-roof tank.*
Right above: 10-ft. 6-in. diam. by 40-ft. 6-in. digester.
Left: 12-ft. diam. by 10-ft. lime tank, 13 ft. ¾ in. to bottom.
Right: 125,000-gal. Horton ellipsoidal-bottom elevated water tank.

CHICAGO BRIDGE & IRON COMPANY

Atlanta, 3.....2142 Healey Building
Birmingham, 1.....1559 North 50th Street
Boston, 10.....1064—201 Devonshire Street
Chicago, 4.....2130 McCormick Building
Cleveland, 15.....2255 Guildhall Building
Detroit, 26.....1565 Lafayette Building
Havana.....402 Abreu Building
Houston, 2.....2163 C & I Life Building
Los Angeles, 17..1561 General Petroleum Building
New York 6.....3333—165 Broadway Building
Philadelphia, 3..1665—1700 Walnut Street Building
San Francisco, 4.....1577—200 Bush Street
Seattle, 1.....1368 Henry Building
Tulsa, 3.....1666 Hunt Building
Washington 6, D. C.....1170 Cafritz Building

Plants in BIRMINGHAM, CHICAGO, SALT LAKE CITY, and GREENVILLE, PA.
In Canada: HORTON STEEL WORKS, LIMITED, FORT ERIE, ONT.

Combine

— with **DURA-BOND** you use 8% less starch than with ordinary corn starch. *You have a net saving of up to $300 a carload!* And many plants now using **DURA-BOND** have reduced scrap waste.

SAVINGS

AND

STRENGTH

— with **DURA-BOND** you maintain a more stable viscosity in circulation. You get a better bond, a dryer board off the machine, and extra coverage. You save on starch *without lowering the safety factor!*

National

DURA-BOND

I'D LIKE TO COMBINE SAVINGS AND STRENGTH

National Starch Products Inc.
270 Madison Avenue, New York 16, N. Y.

PTJ

☐ Please have a representative call

Name_____ Title_____

Company_____

Address_____

City_____ Zone_____ State_____